FLIGHT

The AIRCRAFT ENGINEER & AIRSHIPS

First Aero Weekly in the World

Founder and Editor: STANLEY SPOONER

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EDITORIAL COMMENT

GENERAL SEELY'S very outspoken articles, in the *Evening News*, have caused a great deal of much-needed comment in the Press, much of which, we trust, will imprint itself on the minds of those who are now responsible for our preparedness for instant war with any Power or combination of Powers who may think themselves strong enough to challenge us. We have spoken of the need of preparation for instant war. There may be some who think that such a thing is impossible. We agree that it is improbable, so far as human vision is able to discern the future. The world has but just emerged from the most stupendous struggle in all history—a struggle which we are told was waged in order that there shall be no more war. We have won that war, and with it or out of it has been created what is termed a League of Nations, into whose keeping the peace of the world has been placed. But even now, when the sound of the guns has hardly died away, the vaunted League seems as though it would dissolve into its components, and there is talk among all the nations of the necessity for preparing for another struggle, even more intense than the last. It is all very well for the visionaries to dilate upon eternal peace. Doubtless they are perfectly sincere in their beliefs, but the practical do not share them, because they realise that so long as there are nations and so long as the system of the world is what it is there must and will be wars, and the surest way in which to bring them about is for the balance of military power to become disturbed. In other words, where one member of the community of nations becomes weak, either through want of resources or through a slackening of effort, sooner or later the invitation to attack that weaker member and possess his goods will be accepted.

The Need to be Prepared

It would be idle to ignore the patent fact that the British Empire is the subject of envy—not malicious, it may be, but of envy nevertheless. It was nothing but envy of our heritage which led Germany to her destruction. We were apparently unprepared to resist her aggression—and we know what that state of unpreparedness cost us in blood and treasure. The question we have to ask ourselves now is: Are we going to take such risks again, knowing that to be weak is to invite aggression, or are we going to face the facts of the new situation and prepare for what may in the future befall? There can be but one answer to such a question, and it should be quite unnecessary to state it.

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Air Power the Dominant Factor

Having accepted that, cost what it may, we must be prepared to meet possible aggression, the next question to be discussed is of what shape that preparation should take? Gen. Seely —and other even higher authorities are in agreement

with him—lays it down that the major part of our preparations should be for war in the air. We do not intend to weary our readers with a recapitulation of the reasons which lead up to the conclusion that air power will prove to be the dominant factor in the wars of the future. It is a clear and admitted fact that aviation has completely changed the whole of the strategical aspect of war. As Gen. Seely puts it, "The Power which gains initial command of the air will be able within a very few weeks to destroy the whole of the enemy's merchant ships, all his main railway stations, and, by a combination of explosive and incendiary fire, all his large cities. If chemistry be called in aid, results far more terrible to human and animal life must follow. Moreover, should the attacked be a maritime State, his armed fleet will not help him, for even with our present imperfect methods, merchant ships have a poor chance, and in days not far distant that chance must disappear altogether. This is a gloomy picture, but it is a true picture, and it is folly not to see it clearly and face the facts."

It *is* folly—folly of the very worst description—not to see it. We fear, however, that there are some of those at present in power who either do not see it or are content to pursue the same policy of letting things slide which so nearly brought us to utter disaster in the late war. They must be brought to see that these matters are vital, and that the Air Service, upon which our very existence may depend in the future, is not made the sport of wrong-headed economists and opportunist politicians. The story of the older Services before the War must not be repeated again. We are most of us able to remember the manner in which the Navy was made a mere pawn in the political game, of how it was starved on the shipbuilding Votes and brought down to a mere margin of superiority over the next strongest naval Power, and of the fight that was waged by the advocates of a strong Navy to secure a sufficient preponderance of strength to make attack by an aggressive Power hopeless. We do not want to see history repeat itself in so vital a matter as that of air power, and it will pay to examine the factors which assisted the more far-sighted of our politicians to secure their way regarding the balance of naval power.

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Wanted—An Air League

Fortunately for the nation and the Empire—fortunately for civilisation itself—the advocates of a strong Navy were able to command a powerful support from among the public. In a way the latter had ever since the Napoleonic wars understood more or less that the safety of the Empire was bound up in a preponderant Navy. We say more or less advisedly, because the doctrine was accepted generally for the reasons for which doctrines are usually subscribed to, not because they are understood, but because they are reiterated sufficiently often. That was good only so far as it went, but a doctrine which is imperfectly understood does not become a vital principle. That fact was appreciated by the more advanced advocates of the Navy, with the result that the Navy League was formed for the purpose of pressing upon the public a proper understanding of the functions of the Fleet and the political and strategical reasons underlying the demand for a paramount Navy for the British Empire. As the League grew in numbers and importance its influence was strongly felt upon naval policy, and it is not too much to say that its propaganda was very largely responsible for the fact that that policy has been of a far more settled character during the past twenty years than at any previous period.

Gen. Seely wants to see an Air League—a real League—formed on similar lines, and we most thoroughly and heartily agree. Indeed, we have ourselves advocated such an organisation even before the War. There is no other way of making the question of air power a paramount one than by first of all educating public opinion to its necessity. Once that is done the rest is comparatively easy, for no Government, no set of politicians, dare run counter to the mass of public feeling. As the late Under-Secretary says, the nucleus of such a League exists already, and if branches were established in every town and village the force of an enlightened public demand for a wise and progressive air policy could be brought to bear. Such a body could insist on the support of civil aviation in such a degree as not only to ensure scientific development and continuous research, but also the maintenance of commercial air services which would provide trained *personnel* ready to help in time of need.

There is in existence already such a body in the Aerial League of the British Empire, and it seems to us that if this organisation can be galvanised into life there is no reason why it should not fill the bill. In the days before the War the Aerial League undoubtedly did a lot of good work, but latterly it seems to have fallen into lethargy. At any rate, it is a long time since we heard of any display of activity by it. What appears to be required is that some really live and outstanding personality, commanding the confidence of the public and of the industry, should take hold of the League and infuse into it a spirit of energy. Mr. Holt Thomas, to whose brilliant constructive schemes of civil aviation we shall refer later, writes to *The Times* on the subject of an Air League, but omits to mention the existence of the body to which we have referred. Will not he undertake the necessary initial steps for reorganising the Aerial League along the lines he favours?

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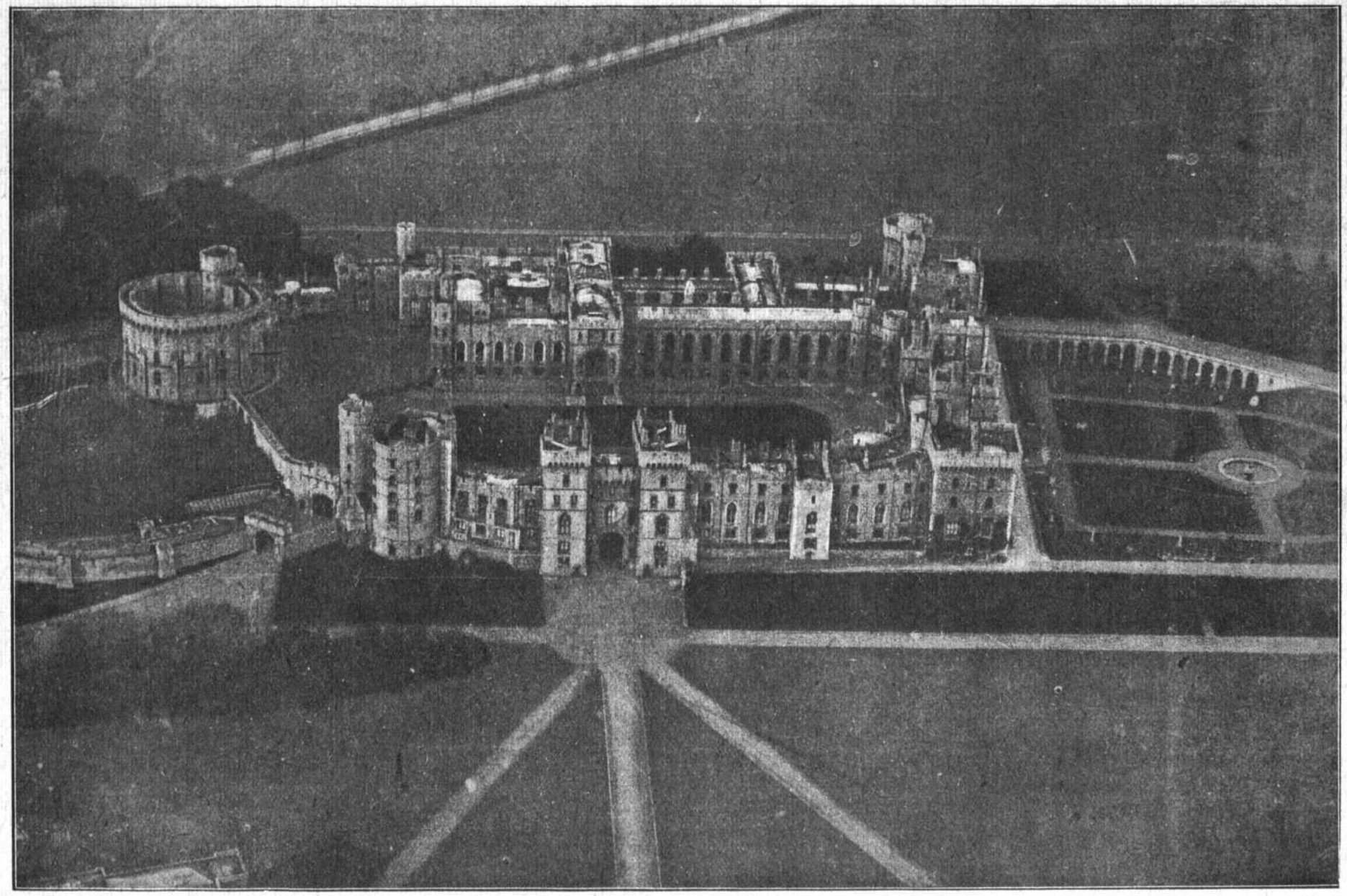
Let There be No Mistake

As we have said, there is no real need to traverse the arguments which have been put forward in support of the case for building up a strong and efficient aerial fighting force. There is not a single authority who ventures to disagree with the view that the next great war will be decided in the air. Gen. Seely in his articles has laid it down as a fundamental article of faith. Lord Weir, in a recent interview in America, has told us that it will be "largely an air war; it will perhaps be begun and certainly ended by the Power which can strike first and hit hardest in the air." Lord Fisher, who certainly knows what he is talking about when he deals with preparation for war, says the same thing. Sir Percy Scott is another who sees eye to eye with them. In fact, the list could be multiplied indefinitely if there were need. But, more significant than anything, is the profound belief which is held in Germany that in a preponderating air power lies her best chance of getting back what she has lost. Here is what one German newspaper says about it: "The Entente has succeeded by its numerical superiority in destroying the military power and prestige of Germany, but in all that pertains to aviation the defeated are still masters of the air, and will undoubtedly remain so in the years to come. The industry of the Entente



Windsor Castle, as seen from a Central Aircraft Co. aeroplane

in this domain is much too far behind ever to catch us up."

We need not question the truth of the premises. That does not matter at all for the purposes of the present discussion. What is of grave import is the light the statement sheds on the hopes which are still entertained by our late enemy. We do not say that the views express the ideas of official Germany. Probably they do not at the moment, since official Germany has far too much to think of to be able to seriously organise plans of future aggression. But let us visualise the arrival of the time when, by a careful fostering of civil aviation and as careful an organisation of her aerial resources as we know her to be capable of, Germany has attained what she is working for—unquestioned superiority in the air. What would of a certainty happen? The answer is too obvious to require stating.

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Encourage Civil Aviation

We do not plead for the expenditure of tens of millions a year on the development of a huge fighting Air Service which may not be called upon to fulfil its ultimate function of making war on the grand scale. On the contrary, we have all along realised that our ends will best be served by keeping up a relatively small fighting force and devoting the bulk of our attention and expenditure to the development of civil aviation. It is to the latter we must look for the *personnel* and the machines in the day of wrath, should the latter ever arrive. In order that we may start fairly on development the first essential is that there shall be a constructive and concrete scheme of organisation to which the State can be asked to lend its countenance and aid. Such a scheme, we submit, is outlined in the communication from Mr. Holt Thomas published in *The Times* and which is reprinted in another part of this issue of FLIGHT. It is a fairly full scheme, thoughtfully worked out and essentially good.

Surely, such a scheme of development as that propounded by Mr. Holt Thomas requires an answer from the Government, who have told us over and over again that they intend to encourage civil aviation by all means in their power. Not only would it give us vastly improved communications, but here we have ready to hand the organisation of those reserves of air power which we have repeatedly pointed out are absolutely essential to the safety of the State and the Empire.

NOBODY'S DARLING.

LLOYD GEORGE: **"Suppose we'd better provide a proper home for the youngster. Who knows, it might snow bombs again one of these days."**

FLIGHT
AIRCRAFT ENGINEER AIRSHIPS

BY THE TECHNICAL EDITOR

(Continued from page 17)

Caproni

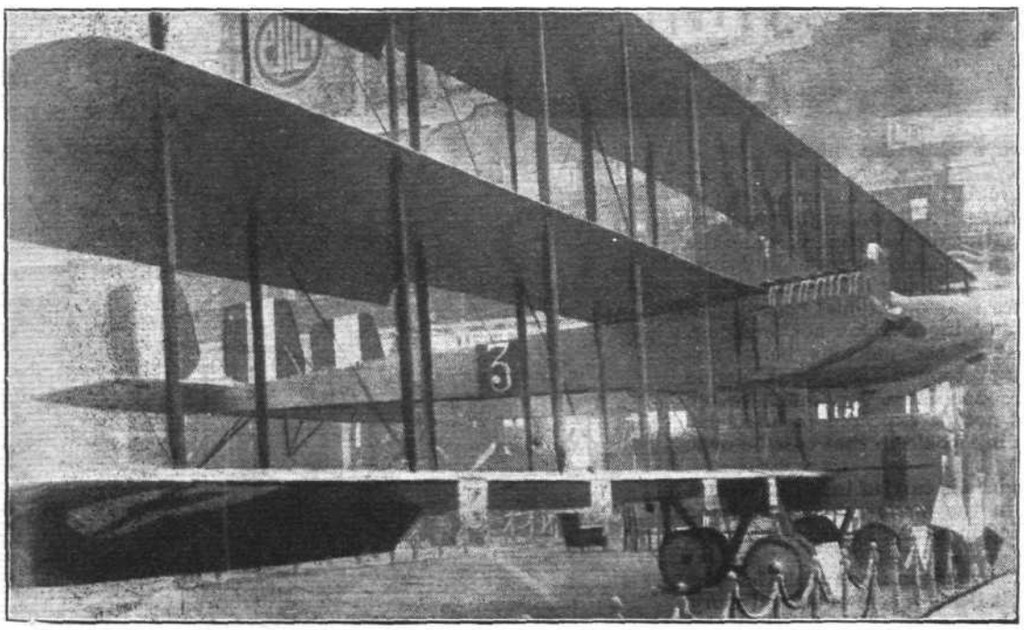
THIS representative of La Bella Italia does not make a very striking exhibit with his old 1915 type triplane, and the chief impression left upon one when leaving the stand is · What plucky fellows those Italian aviators must be. The machine is fitted with three Fiat engines of 200 h.p. each, two being placed in the nose of the *fuselage*, and the third driving a pusher airscrew from the central *nacelle*. The machine carries its nest of bombs under the *nacelle* on a special arrangement of bomb racks, and is said to have crossed the Alps with a load of 3,000 kg. on board. One trusts that a small portion of this load only was in the form of bombs, since otherwise a forced landing would have been anything but pleasant to the occupants. As a relic of old times the machine is interesting and almost pathetic, but at a modern aero show it looks somewhat out of place.

Caudron

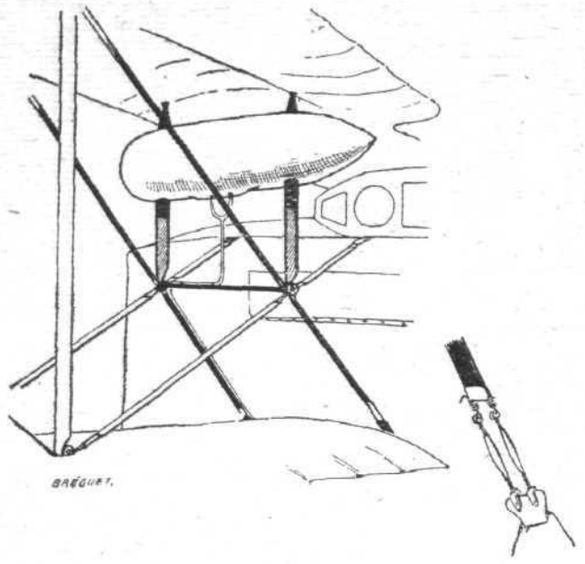
Altogether three machines were shown by René Caudron, two in the Grande Nef, and one in the gallery. Of the two machines exhibited in the main hall one is the C 25, a very large three-engined biplane, carrying 16 passengers in addition to two pilots, or one pilot and one engineer or wireless operator. The other is a smaller machine, the C 33, which is fitted with two 80 h.p. le Rhone engines, and carries three passengers in addition to the pilot. Although both machines have many points of interest, they are not altogether above criticism, and the general impression of them is that they are somewhat behind the time.

The C 25 is a very large machine, its span being 82 ft. 6 in., and its total wing area 1,670 sq. ft. The cabin is beautifully finished, in typically French style, and whatever one has against the machine as an aeroplane, the passengers have nothing to complain of as regards comfort and ease. Of room there is plenty, both in the main cabin aft, which accommodates the majority of the passengers, and in the smaller forward cabin, which is reached from the main one by diving under the pilots' seats. The *fuselage* is three-ply covered in front for the whole length of the cabin, aft of which the covering is in the form of fabric.

The arrangement of the engines is rather unusual, and certainly would appear to have its good points. Two of the three Canton Unné type Z 9 250 h.p. engines, are mounted



The Caproni Exhibit: This consists of an old, 1915 type, three-engined triplane



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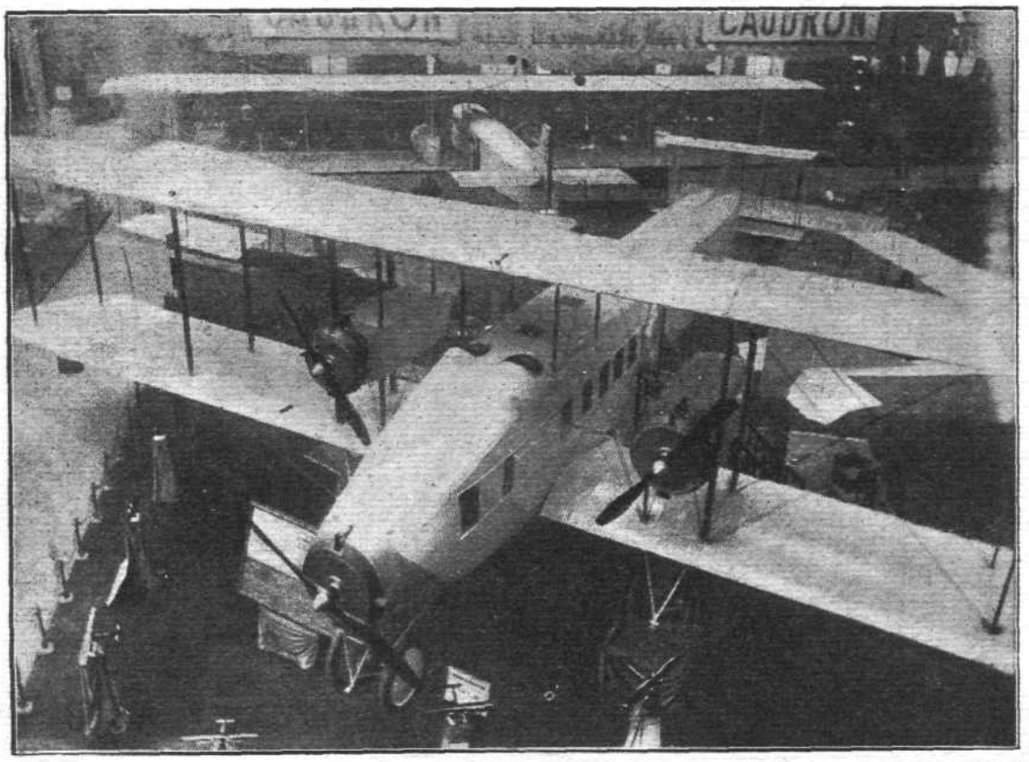
LOUIS BREGUET: In all the machines shown by this constructor the fuel tanks are mounted between the planes. The sketch (referred to last week) shows the method of mounting on the seaplane

Owing to the large span of the machine the main planes are made to fold back, the outer engine struts being in duplicate, so to speak, placed side by side and in surface contact with one another. This arrangement leaves a Vee-shaped groove down the entire length of the rear edge of the struts, which is no', one imagines, conducive to low resistance. The feature which we like least of all in this machine is the wing bracing, which is in the form of solid piano wire of great thickness. Not only does it appear to us that to bend a wire of such thickness without materially affecting its strength must be a difficult job, but such loops are very liable to stretch in use, which would entail a great amount of work in trueing up when the machine has been flying for some time. The inter-plane struts, which are of wood, are very thin for their length, and it has been necessary to provide them with king posts and lateral bracing to prevent them from buckling. One would think that it would have paid to have made the struts of sufficient thickness to carry their loads without this external aid.

Ailerons are fitted to both top and bottom planes, and there are, in addition, auxiliary *ailerons* between the planes. The main ones are not balanced, but the inter-plane ones are pivoted a considerable distance behind their centre of pressure, and as they are linked up, as shown in one of the accompanying sketches, to the main *ailerons*, the whole system is balanced.

A biplane tail is fitted, and there are three rudders, of which only the outer ones are balanced. The vertical fin does not look any too large, and the load on the rudders, when



On the Caudron Stand: View from above of the large three-engined Caudron passenger machine

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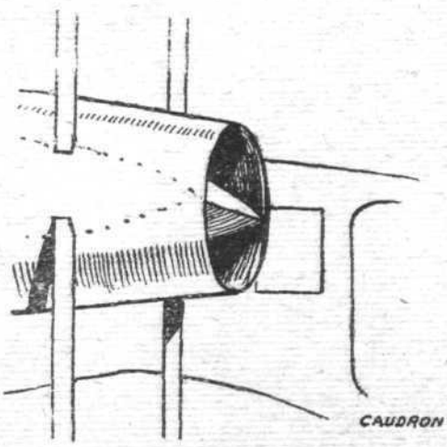
on the wings in the usual way, while the third engine is placed in the nose of the main *fuselage*, where it is supported when the machine is on the ground, by an undercarriage of its own. There is thus very little likelihood of the machine turning on to its nose when alighting on bad ground, while the three engines would seem to afford added security in flying, since the fact of one cutting out will only reduce the power by one-third, and one presumes that directional control can be maintained with one of the wing engines not working. Even in the worst case—that of the machine being untrollable with one wing engine stopped—the front engine would be sufficient to give the machine a very much better gliding angle, even if it could not be expected to enable it to remain in the air, as the loading would in that case be over 48 lbs./h.p.

The fuel for the two side engines is carried in tanks behind the engines, the only petrol in the *fuselage* being that for the front engine, which is carried in a tank between the front cabin and the engine.

The two pilots are placed side by side in front of the leading edge of the planes, their cockpit being a sort of second story above the front cabin. From here, as the pilots are outside, the view is by no means bad, especially as the nose of the body has a pronounced downward slope.



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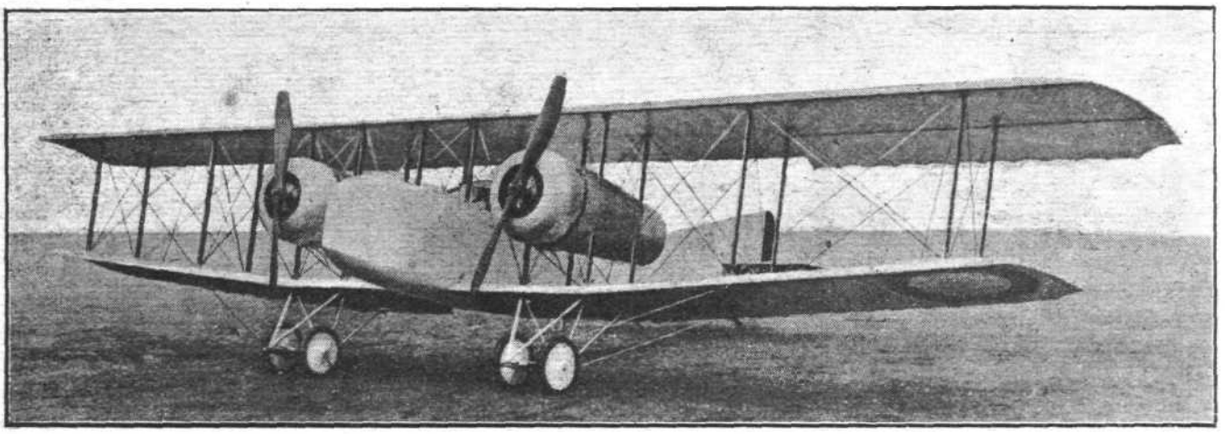
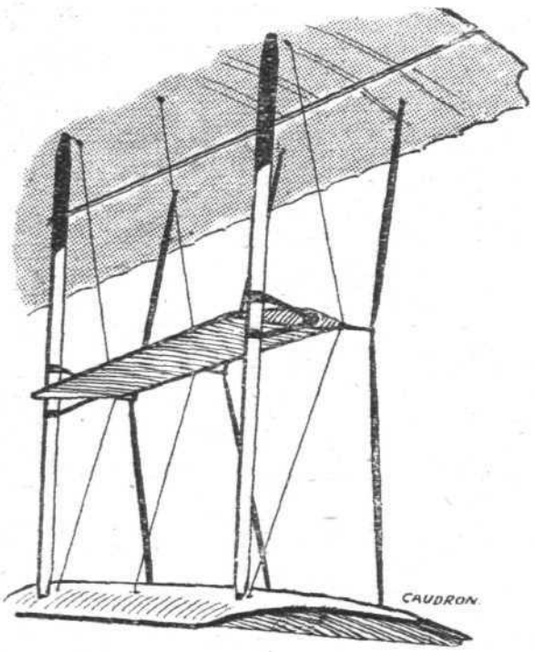
THE CAUDRON C 33: The wedge-shaped tanks behind the Rhone engines are enclosed in a cowl terminating at the back in an open truncated cone



THE CAUDRON C. 33 : This machine is named "Monsieur-Madame."



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The Caudron way of balancing *ailerons* : The auxiliary *aileron* between the planes is pivoted behind its centre of pressure, and as it is linked up to the main *ailerons*, serves to balance them

one wing engine is out of commission, would probably be considerable.

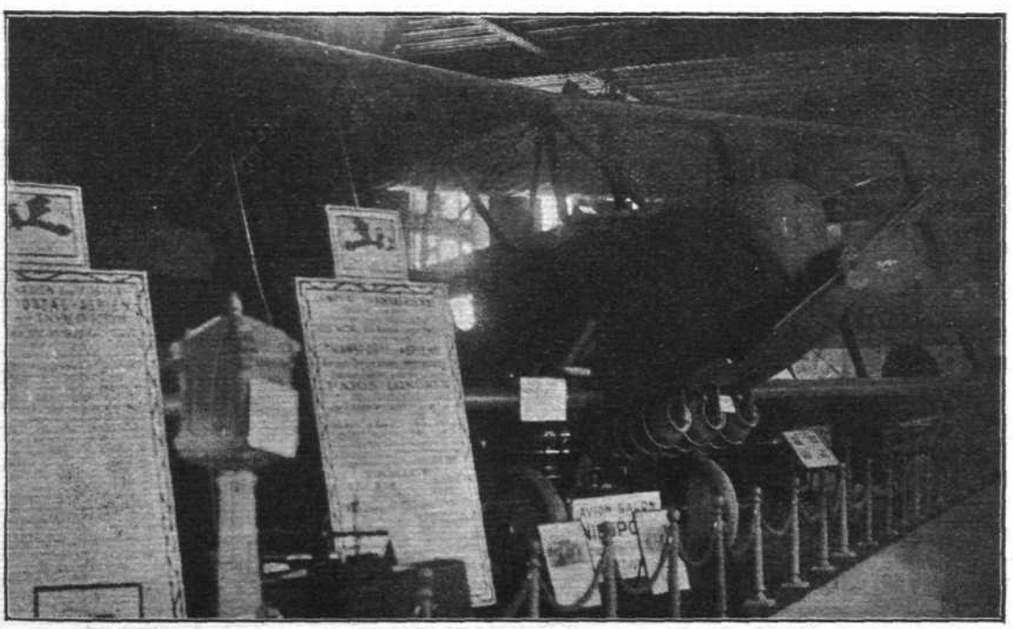
The second machine shown in the Grande Nef is of very much neater appearance. It is a type C 33, with two 80 h.p. le Rhone engines placed on the wings. In addition to the pilot it carries three passengers, two of whom are accommodated inside a neat little cabin, while the third sits in the front seat in front of the pilot. The two seats in the cabin are of the wicker-work variety, comfortably upholstered and mounted on a swivel, so that the occupants can turn about slightly and stretch their legs, which is a consideration on a long journey. With three passengers and six hours' fuel the machine does a speed of 93 m.p.h., which is by no means bad for a total of only 160 h.p.

The third machine, the G 3, which was shown in the gallery is the well-known type on which so many French pilots have been trained. It was on a similar machine that the late Jules Vedrines landed on the roof of the Lafayette building last year. The machine is so well-known in this country, from the number built by the British Caudron Co., that no description of it is called for here.

Compagnie Gènèrale Transaèrienne.

This firm, which looks after the Paris end of the British Aircraft Transport and Travel, is showing one machine in the gallery, a Nieuport-built biplane with cabin for five passengers. The machine also carries a wireless operator, and is fitted out with wireless transmission and receiving sets. The engine is a 450 h.p. Renault, entirely cowled in, which gives the machine a speed, it is stated, of about 118 m.p.h. The radiators, three of the Lamblin type, are mounted under the front part of the *fuselage* between the front undercarriage struts.

The main feature of this Nieuport machine is its wing



Compagnie Gènèrale Transaérienne : This firm was showing in the gallery a Nieuport-built passenger machine intended for the London-Paris service.

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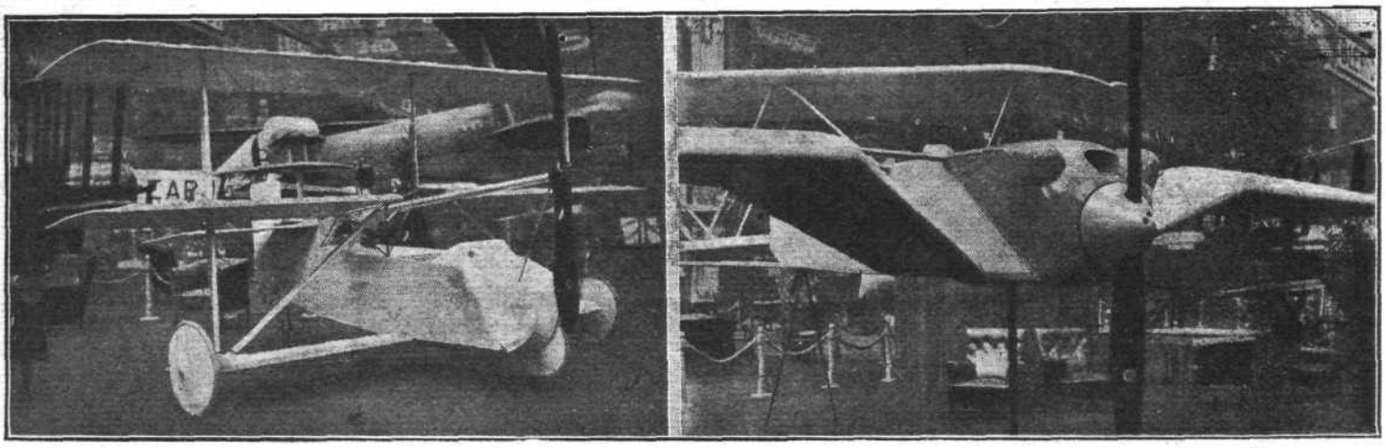

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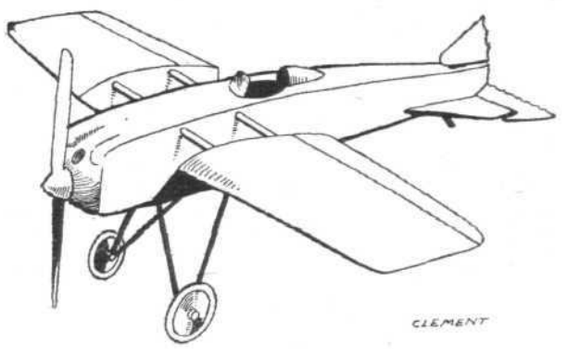
THE LOUIS CLEMENT MACHINES: On the left, the little triplane with 35 h.p. Anzani engine. On the right, the racing monoplane with retractable under-carriage

section, which is extremely thick, not unlike the Schukowsky aerofoil, or those of some of the Fokker machines. The section is, however, uniform throughout, that is to say, there is no tapering of the spars, and the section does not decrease either in chord or depth. *Ailerons* are fitted to the bottom plane only, and are very long, extending nearly up to the sides of the *fuselage*. The top plane is in two halves bolted to a cabane consisting of two pairs of N formation struts placed in the form of an inverted vee. In view of the thick wing section the speed of 118 m.p.h. is very good, and although the loading is heavy the machine probably lands quite slowly on account of the high-lift section.

The Louis Clement Machines

In one respect only is there any similarity between the Clement machines exhibited at this show and those of former years: metal construction has been extensively employed. This was ever one of the features of the Clement aeroplanes, but it cannot be said that this constructor has progressed much, considering his long experience of metal construction. One of the panels on the stand bears the legend: R. Moineau, Ingénieur. We do not know if this is our old friend of pre-War Breguet fame, but the fondness for tubular construction which is evident in the machines would almost indicate this to be so.

One of the machines exhibited is a racing monoplane with curious wings, the roots of which are placed at a very pronounced dihedral angle, running, in fact, from the bottom of the *fuselage* up to a level with its top in a distance of a few feet. From the points where the wing spars flatten out to a horizontal plane the wings are braced by horizontal transverse tubes running to the top of the body. No other bracing is provided, but as the wing section is very thick the metal spars are probably able to take the load with sufficient safety, especially as they are of metal construction (duralumin). With regard to this, however, it strikes one that the best possible use has not been made of the material, the spar being of an I-section built up of a vertical web and of flanges formed by angle section strips rivetted to the web. It does not appear probable that with a section like this anything like the full strength of the material can be realised.



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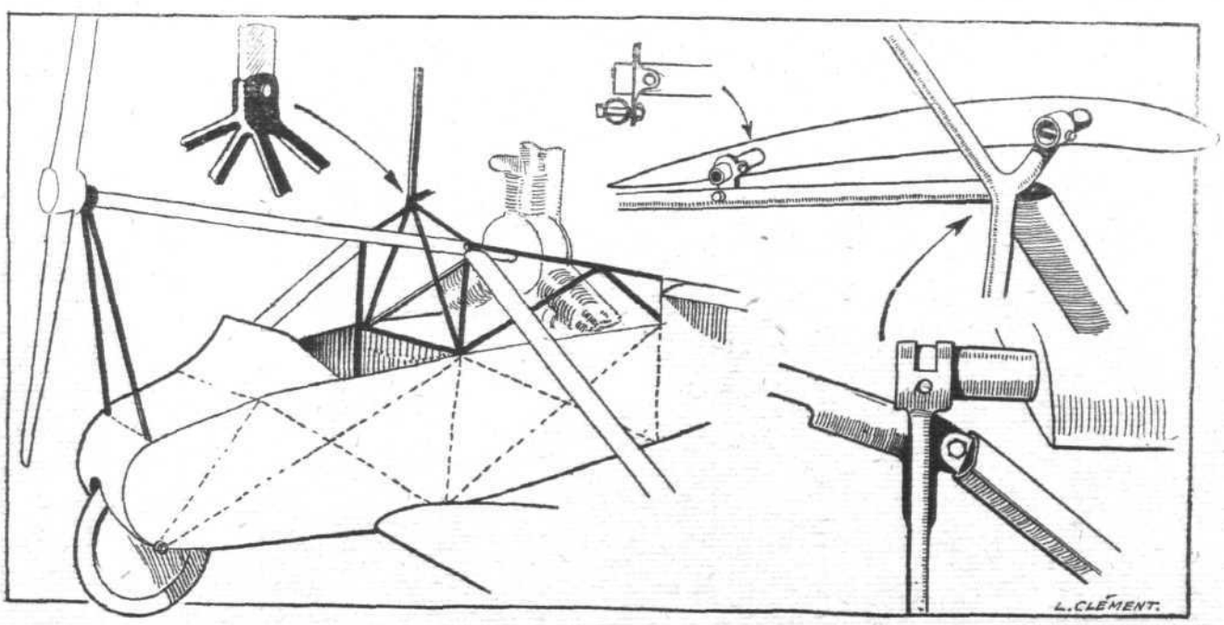
THE L. CLEMENT MONOPLANE RACER: View from above



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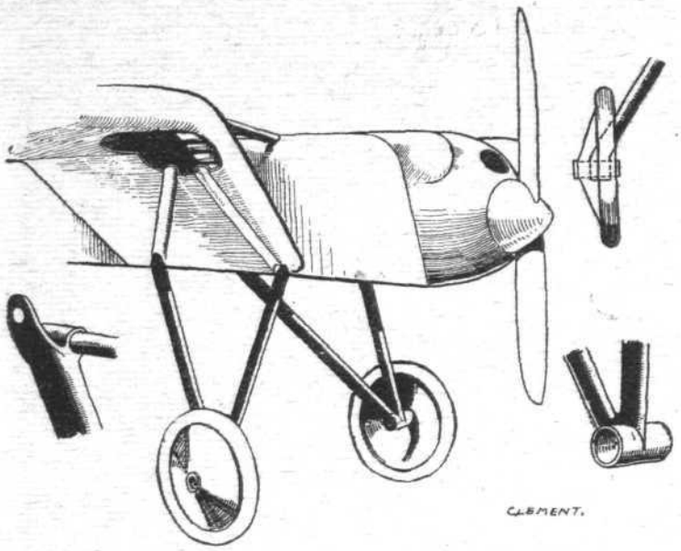
The long shaft drive and some constructional details of the L. Clement triplane, 35 h.p. Anzani engine.



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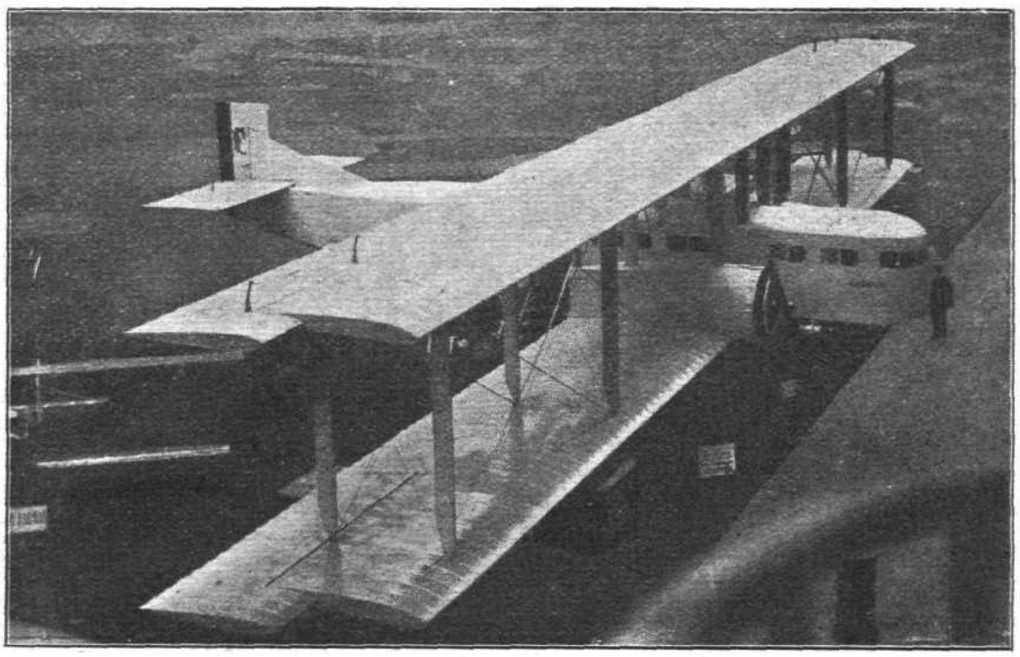
The L. Clement Monoplane has a retractable chassis which can be drawn up into the wings: Some constructional details.



The Farman "Goliath": A similar machine was used in the Paris-Dakar flight

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The engine fitted is a 180 h.p. Hispano-Suiza, entirely cowled in. The radiator is placed behind the engine and is capable of being raised or lowered so as to vary the cooling.

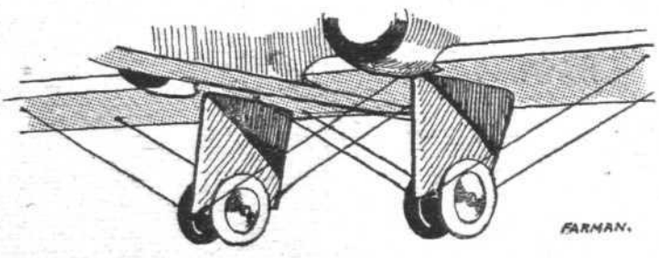
Perhaps the most notable feature of this unusual machine is the undercarriage, which consists of two simple Vees, each carrying a disc wheel, without any shock-absorbing arrangement whatever. Each Vee is hinged at its top so as to be able to swing out laterally, but as the undercarriage was not rigged up complete one was unable to discover the exact *modus operandi*. When in their horizontal position the Vees and their respective wheels are housed in recesses in the lower surface of the wings. It might be imagined that the opening thus left when the undercarriage is down in its vertical position would play havoc with the fabric attachment, which, one imagines, would be very apt to be blown off. The idea seems to have something to recommend it, however, and with certain modifications might prove worth while for racing machines. At the rear the *fuselage* carries a tiny rudder, which is assisted by the extreme rear portion of the body itself which is hinged to move with the rudder. One has certain misgivings as to the efficacy of the little length of fairly thick *fuselage* stern to produce much of a turning effect. Of fins there is none.

In addition to the monoplane racer, L. Clement exhibits a small triplane of very curious design. The two upper planes are of greater span than the bottom one, which carries at its tips the two main landing wheels. The body is very low and carries, in an opening in the middle plane, a 35 h.p. Anzani engine. Transmission to the tractor screw is by a long shaft passing over the pilot's head, supported in front by a couple of tubes from the nose of the *fuselage*. In the nose, immediately under the airscrew, is a third wheel, designed evidently to prevent the machine from digging the nose of the low body into the ground.

The pilot sits in a canvas hammock seat with his head just in front of the planes, and whatever objections one may have to other features of the design, he certainly obtains a very good view. Lateral control is by warping the top and middle plane, the lower plane being rigid. There is only one strut on each side, attached to the front spar. From the top of each strut run two lift wires, one to the nose and one to the stern of the *fuselage*. These wires thus, in addition to their main function as lift wires, act as drag and anti-drag wires. The bottom plane is also braced to nose and stern to give it greater rigidity in a longitudinal direction. The landing shocks are transmitted, *via* rubber shock-absorbers, to diagonal tubes running to the roots of the centre plane. As, however, a space has to be left here for the propeller shaft, the landing shocks on the two diagonal tubes are transmitted to the single vertical centre strut and to the *fuselage via* a kind of roof girder truss consisting of four tubes meeting at a point and forming a bridge over the propeller shaft. Although the machine looks very unorthodox it is not without its good points, and except for the placing of the tail there is not really very much to find fault with as regards principle of design. The leading edge of the tail almost touches the trailing edge of the middle plane, and one imagines that the machine will hunt or, to use a more modern phrase, pitch violently.

The Farman Exhibits

There was nothing in the way of surprises on the Farman stand, all three machines exhibited being known beforehand. Most imposing was, of course, the Goliath, with its luxurious cabin. Also a certain amount of sentimental interest attaches to this machine on account of its being similar to that used on the famous Paris-Dakar flight. With its square wing tips and general angularity the "Goliath" is not exactly a pretty machine, but there is somehow a very business-like look about



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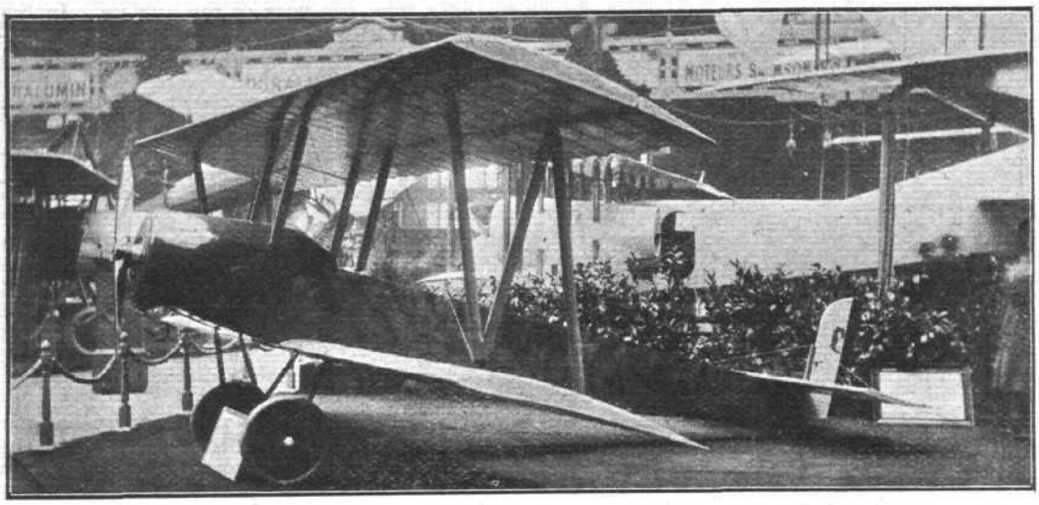
Sketch showing the undercarriage of the Farman "Goliath."



The Farman "David," a small two-seater biplane with 60 h.p. Le Rhone engine

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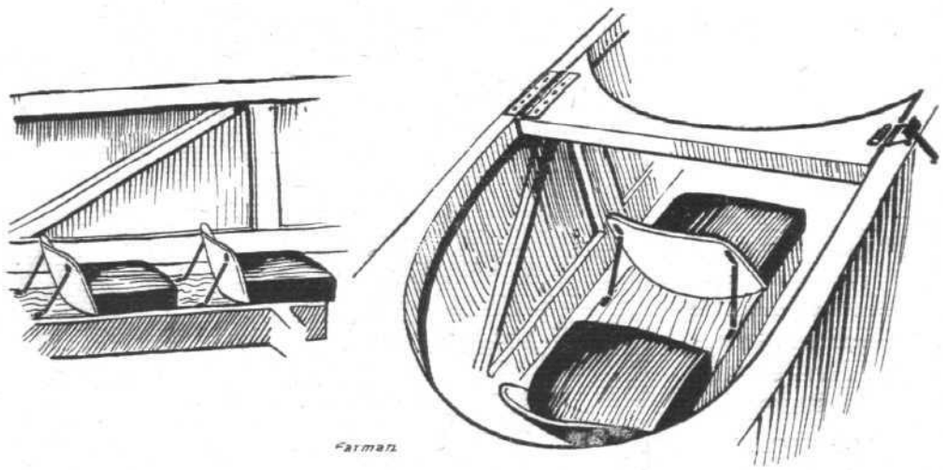
it which is rather pleasing. Fitted with two Salmson engines of only 260 h.p. each, the machine carries 20 passengers and has a speed of 100 m.p.h., which is extremely good. From the table published in our last week's issue it will be seen that while the weight of the machine empty is 4,400 lbs., the weight fully loaded is 10,200 lbs. This ratio is somewhat unusual (43·1 per cent.), and points to very light construction. Probably no other machine at the show can boast a similar ratio. Out of the load carried fuel occupies about 1,400 lbs., the useful load, apart from fuel, being 4,400 lbs., or equal to the empty weight of the machine. One takes it for granted, of course, that the requisite factor of safety is provided, in which case the structural weight of the "Goliath" is very low, as the figures show.

The two Salmson engines are placed on the bottom plane, comparatively close to the *fuselage*, and compared with some twin-engined machines the centre of thrust appears to be very low. The tanks are carried in the engine *nacelles*, behind the engines.

The pilot sits with his head projecting into the open, in the left-hand side of the *fuselage* ahead of the wings. The passengers are well provided with windows and the view, especially from the forward ones, is extremely good. Admission to the cabin is by means of an ordinary door in the starboard side.

The second machine exhibited on the Farman stand was the small sporting biplane about which a good deal had been heard before the show. This little machine, the "David," has made several notable flights, piloted by the Farman pilot, Bossoutrot, among which may be mentioned one from Paris to Biarritz. This flight was made in the following



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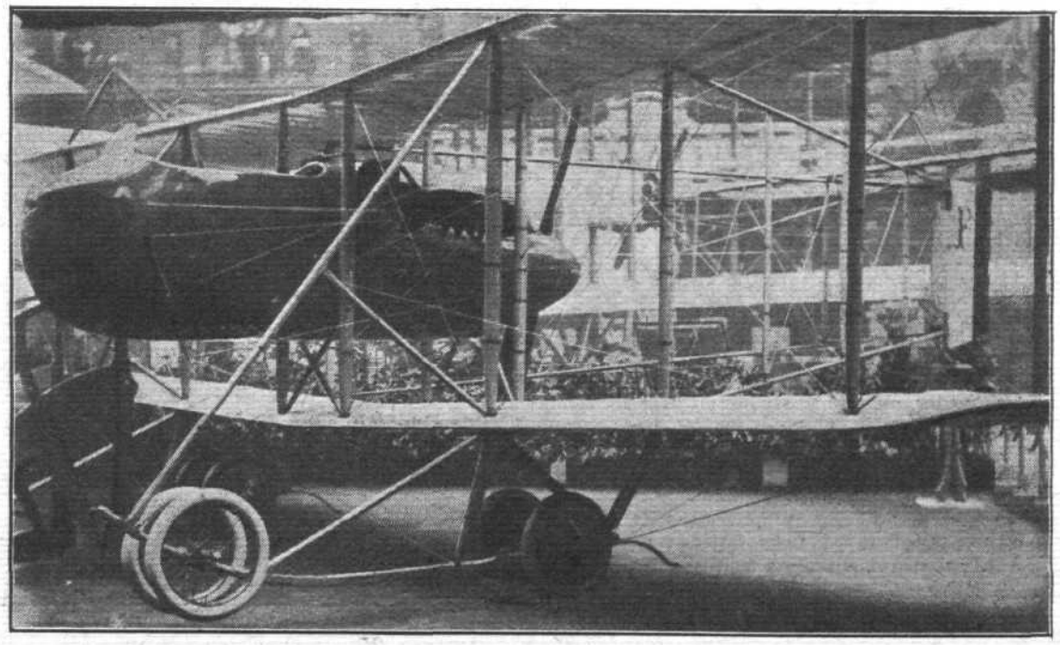
THE FARMAN "DAVID": Two views of the small tandem seats.



The Farman School Machine: This training biplane is in many respects reminiscent of the pre-War Farman "pushers"

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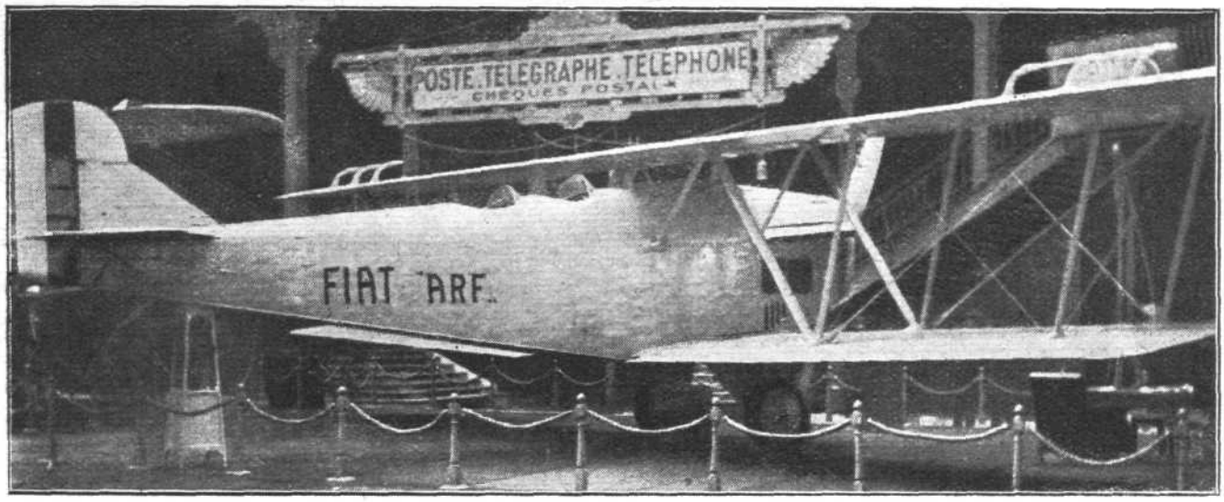

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THE FIAT "ARF": This Italian biplane is among the finest machines at the Show

times: Toussus-le-Noble to Bordeaux (310 miles), 3 h. 50 mins. Bordeaux to Biarritz (108 miles), 1 h. 25 mins. Total, 418 miles in 5¼ hours. The fuel consumption on this flight was 65 litres (14½ gallons) of petrol and 2·2 gallons of oil, the cost of which is 111 fr. This is certainly cheap travelling in these days, but something should, of course, be allowed for maintenance and depreciation. However, Farmans are certainly demonstrating that flying need not be the very expensive pastime that some people imagine it to be. The price of the "David" is 15,000 fr. (or about £375 at the present rate of exchange).

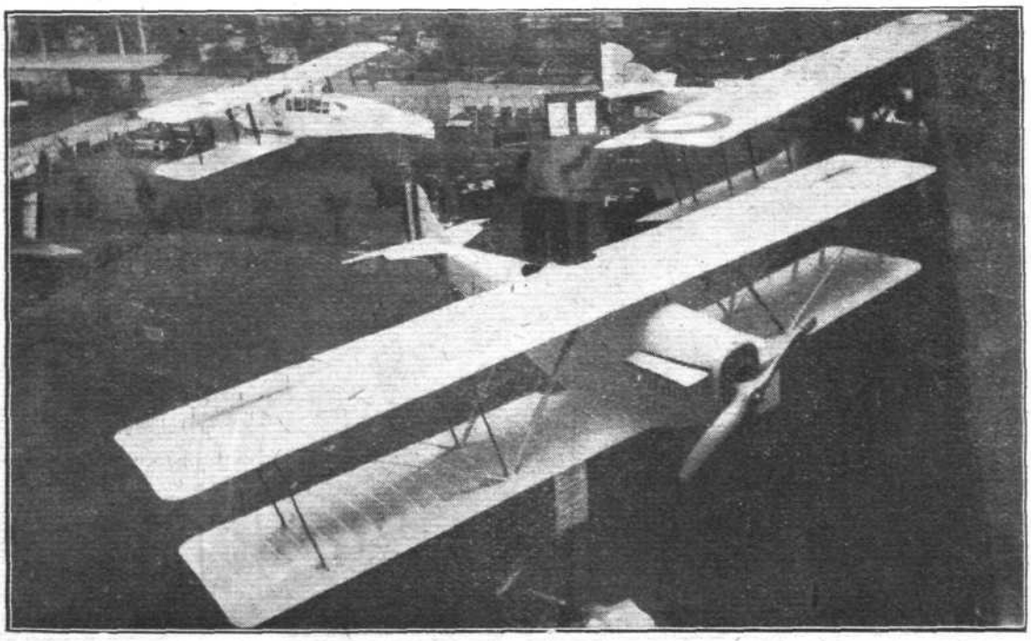
The Farman "David" is not a particularly pretty machine, having evidently been designed with a view to ease of production and replacement. The *fuselage* is of rectangular section, with no deck fairing aft of the cockpits. The covering is of three-ply wood, attached to the *longerons* and to vertical and diagonal wooden struts. The two seats are placed very close behind one another on a small box-like support, the passenger sitting with his legs spread out, one on each side of the pilot. A small aluminium cowl encloses the neat little Le Rhone 60 h.p. engine, except for a small opening in front and one underneath. The wings are square tipped, probably with a view to simplicity and cheapness of construction, and are staggered. The centre section of the top plane is carried on four vertical struts, while the interplane struts number one set on each side, the struts being placed in N formation so as to do without incidence wires. The bracing is in the form of piano wire.

Finally, there is shown on the Farman stand a school machine which is very reminiscent of the pre-War Farman "pushers." In order to prevent turning over it is fitted with extra wheels near the front end of the skids, otherwise it is, as a type, similar to the older machines.

The Fiat Machine

In the two-seater class the Fiat was one of the finest machines exhibited at the show. Fitted with a Fiat engine of 700 h.p., the machine is stated to be able to maintain a speed of 162½ m.p.h. for 20 hours. This should have enabled her to make the Transatlantic journey with ease, and this, as a matter of fact, was the purpose for which the machine was originally designed. When the flight was accomplished by the late Sir John Alcock and Sir Arthur Whitten Brown, the Fiat was not put to the actual test, but there is little doubt that the machine will be heard of in connection with some really fine flights during the year just commenced. Thus it is rumoured—*on dit*—that after the closing of the Paris Aero Show it is intended to attempt a non-stop flight from Paris to Cairo, a flight which, if it succeeds, will reflect great credit on the designers of both the machine and its engine.

The accompanying illustrations will give some idea of the general outline of the beautiful Fiat biplane, type A.R.F. The body is of generous proportions, partly on account of the large 700 h.p. Fiat motor, and partly to afford space for the large tanks necessary to hold sufficient fuel for 14,000 h.p. hours. As a matter of fact, one need not take the statement of 20 hours at 162½ m.p.h. too literally. The duration has probably been worked out for cruising speed while the speed stated is probably the maximum. Even so, however, the



The F.I.A.T. biplane seen from the gallery

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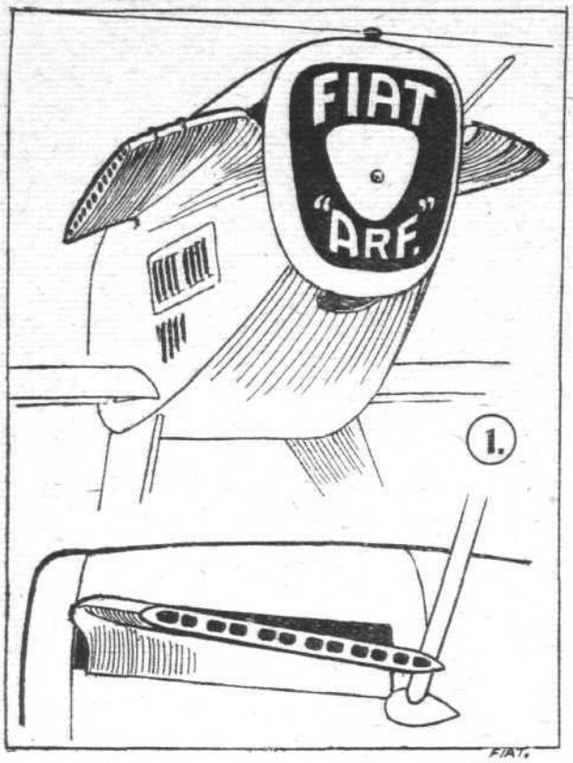

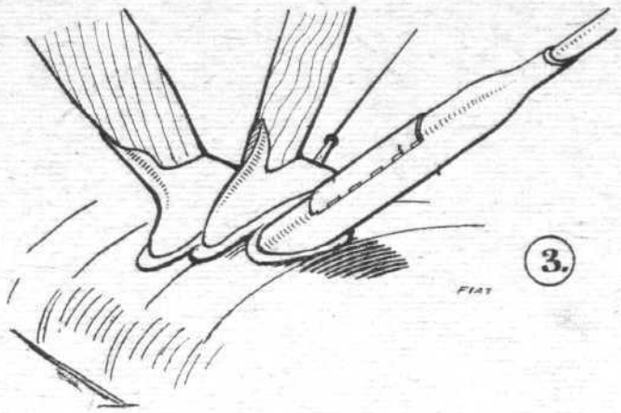

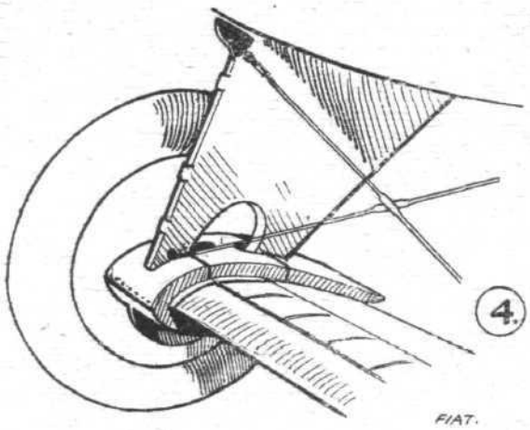

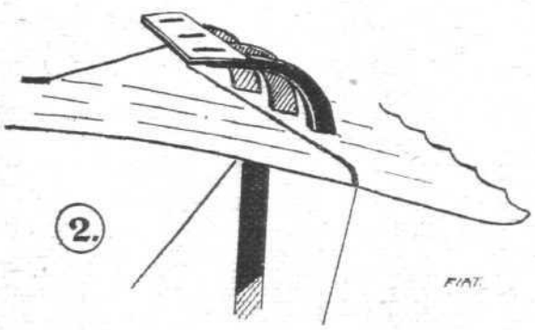

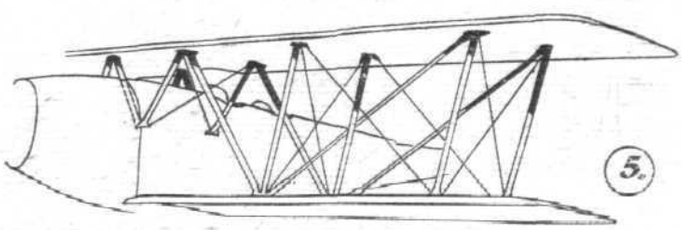

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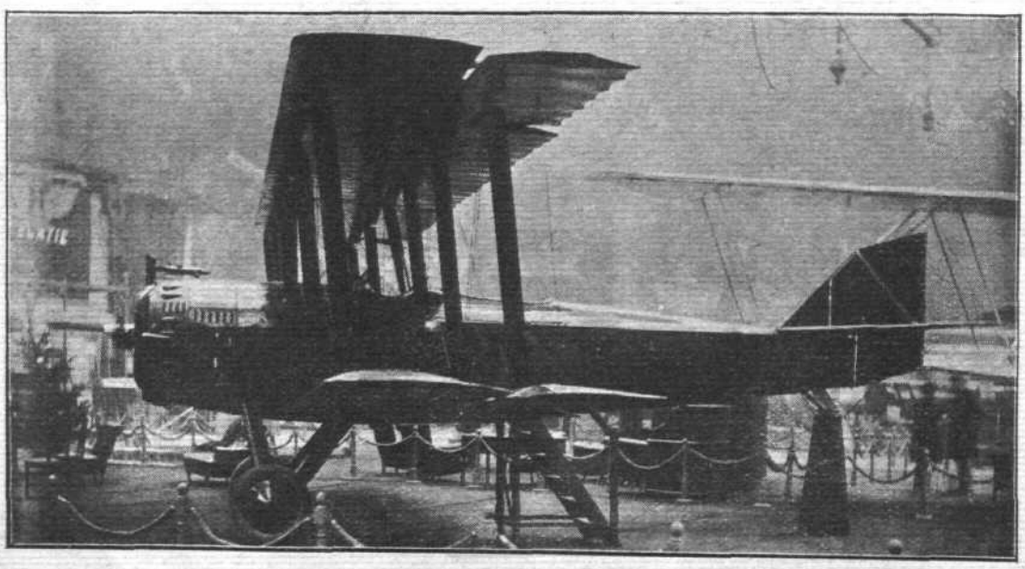
SOME FIAT DETAILS : 1. The exhaust pipes are enclosed in stream-line casings to reduce wind resistance. 2. The *ailerons* are balanced by small auxiliary planes above the main planes. 3. The attachments of the inter-plane struts to the wings are enclosed in faired casings of aluminium. 4. The chassis vee is enclosed, and the axle rests in a large ply-wood fairing. 5. The Fiat wing bracing is somewhat unusual, there being no lift wires in the inner bay.

performance is no mean one. With the large heavy engine out in front and the tanks approximately over the centre of pressure, the seats for the two occupants are fairly far back, behind the trailing edge of the planes, where the view, in spite of the bulky *fuselage*, is quite good.

The main planes show the usual Fiat bracing, *i.e.*, there is



The Latécoère biplane, designed for fast mail service

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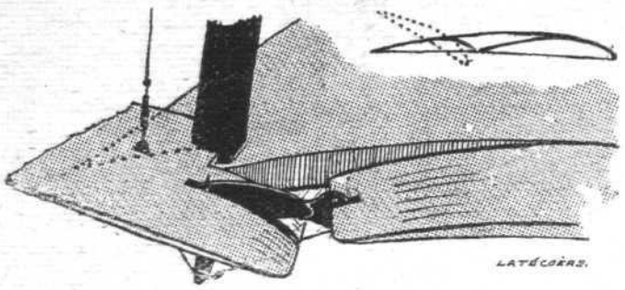

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The *ailerons* in the Latécoère machine were balanced, and, probably with the idea of making them more effective, the tip of the wing is thinned down to a fine edge in front of the *aileron* balance, giving somewhat the appearance of a Howard-Wright double-cambered wing section.

in the centre a set of struts placed in W formation, the main inter-plane struts are raked outwards, and the bay nearest the body has no cable bracing, a diagonal strut for each spar performing the double function of lift and anti-lift member.

Ailerons are fitted to the top plane only, and are balanced by small auxiliary planes mounted on brackets from the main *aileron* and placed above the main plane. Similar forms of *aileron* balances have been employed by Avros in this country and by various German designers.

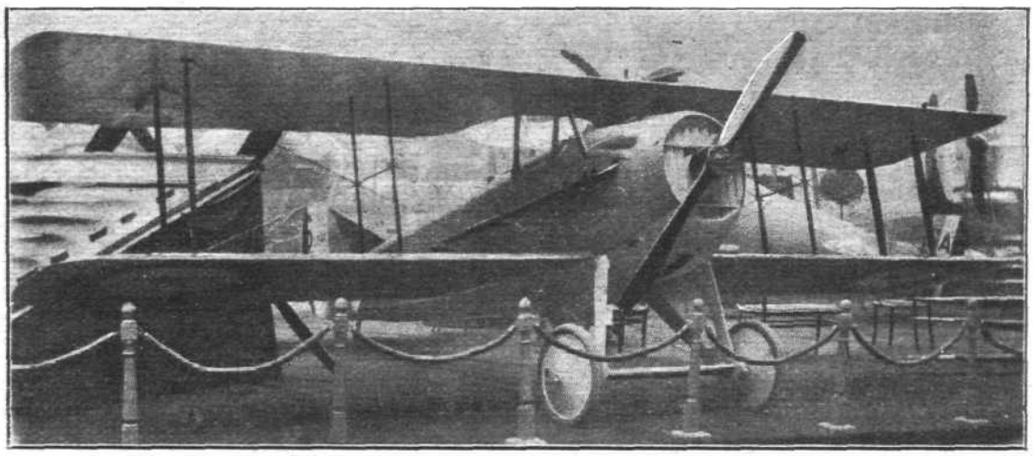
In other respects the Fiat is of more or less standard design, and the merits of the machine do not so much lie in any particular ingenious detail as in an all-round efficiency and cleanness of design.

The span of the Fiat biplane is 53 ft. 2 ins., the length 33 ft. 3 ins., and the height 12 ft. 2 ins. The weight of the machine empty is 5,150 lbs. The weight of petrol and oil for the 3,000 miles journey is 4,672 lbs., and the remaining useful load, which includes the pilot and passenger, 450 lbs., giving a total loaded weight of 10,272 lbs.

Latécoère

The firm Lignes Aériennes Latécoère has, from September 1 to December 15, 1919, run a regular air service between Toulouse and Rabat (in Morocco), the machines leaving Toulouse on the 1, 4, 8, 11, 15, 18, 22 and 25 of each month, and Rabat on the 3, 6, 10, 13, 17, 20, 24 and 27 of each month. The times for the journey are as follows :—Leave Toulouse at 9 a.m., arrive at Barcelona at 11.30. After lunch, at 1 p.m., the machine leaves for Alicante, where it arrives at 4 p.m. The next morning a start is made at 8 a.m., and Malaga is reached at 11.30. At 1 p.m. the machine leaves Malaga and arrives at Tangier at 2 and at Rabat at 4.30. During the period September 1 (when the service was inaugurated) to December 15 the firm claim that their machines have flown a total distance of 132,000 kilometres (about 82,000 miles) without a single mishap.

At the show this firm was showing a single-engined machine designed for postal work on the Toulouse-Rabat route. The machine is a tractor biplane with 250 h.p. Canton Unné engine. In addition to the pilot, the machine carries two passengers and a certain amount of mail. It is stated by the constructors that in addition to the pilot and 5½ hours' fuel, the machine has a useful load of 1,100 lbs. The machine is of quite standard design, and the only unusual feature one was able to discover was a peculiar shape of the wings near the tip. The *ailerons* were provided with balancers projecting into a cut-out portion of the wing. The tip of the wing corresponding to this had its top camber swept down to form a thin trailing edge just in front of the *aileron* balance. The effect, when the *aileron* is in its neutral position, is not unlike the Howard-Wright double cambered wing section. The object is probably to increase the efficiency of the *ailerons*.



A standard Spad built by Pierre Levasseur.

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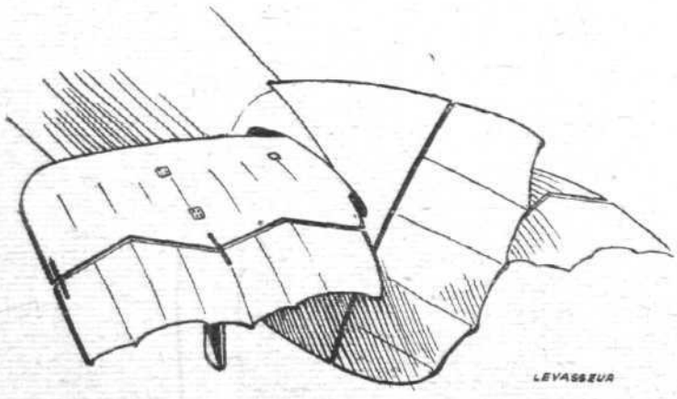
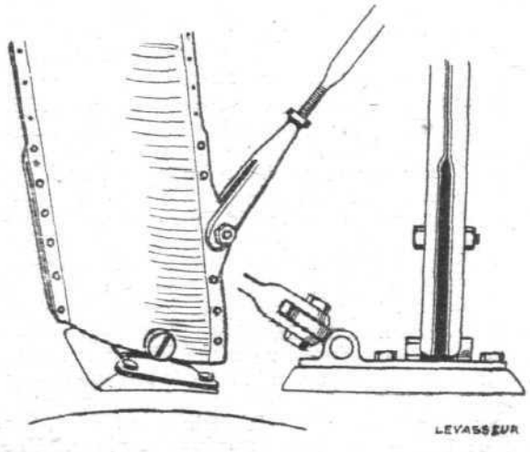
Pierre Levasseur

In addition to an extensive collection of airscrews, including some with variable pitch and one huge airscrew of





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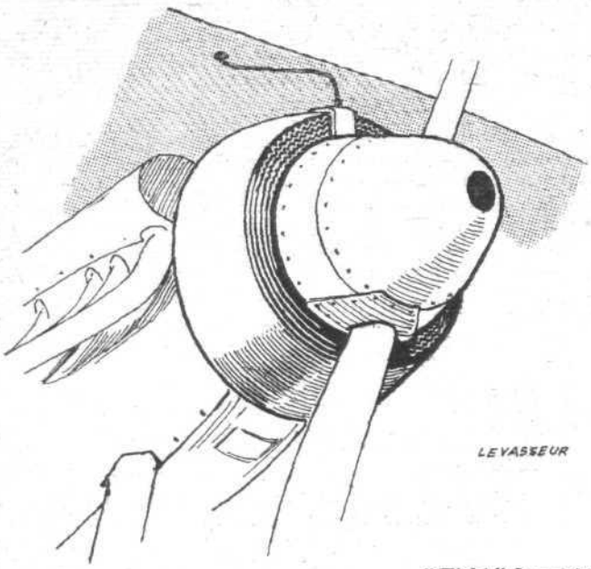
A French way of balancing the elevators. The tail of the P. Levasseur. On the right the inter-plane stru attachment.



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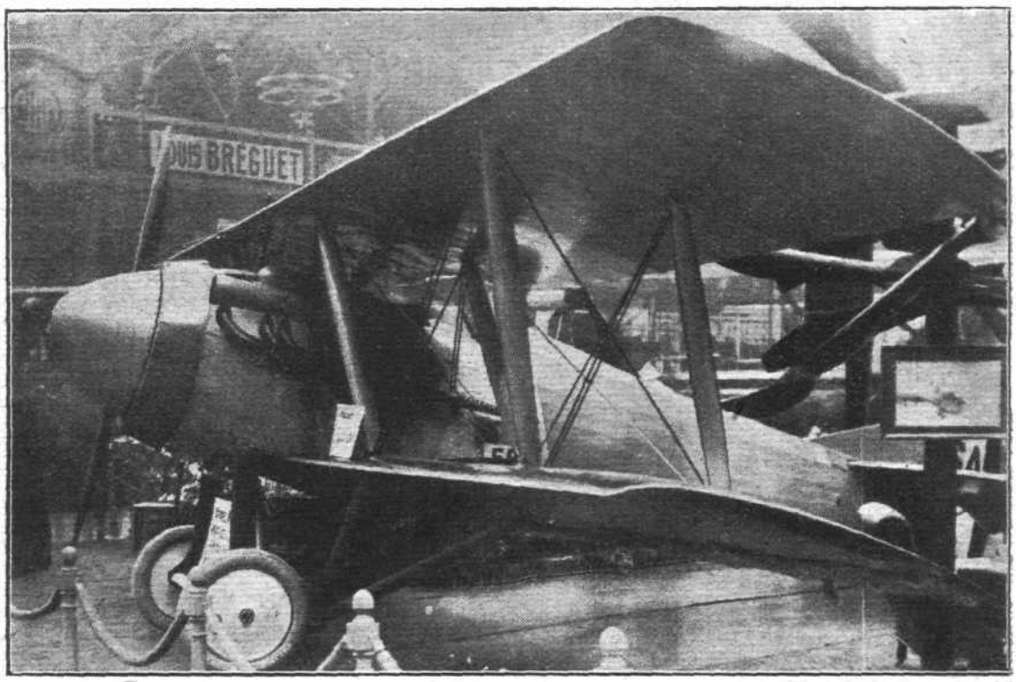
The Radiator of the Pierre Levasseur is of circular shape, and entirely surrounds the nose of the *fuselage*.

The wing bracing is of unorthodox design, there being no struts connecting the top plane with the *fuselage*. The usual centre section struts are replaced by short lengths of lift wires, running from the body to the top of the first pair of inter-plane struts. From the lower ends of these struts, or rather from the bottom spars, two struts converge downwards and inwards, where they are attached to the lower member of the under carriage. The absence of centre-section struts and their bracing naturally leaves the pilot's view unobstructed, but otherwise it would appear that there is no very great advantage to be derived from this arrangement.

A feature of the planes of the "Sab," as the machine is styled, is that the top surface of both planes is covered with three-ply wood from the leading edge to the rear spar. *Ailerons* and elevators are balanced by having their leading edges arranged in the form of saw teeth, as shown in one of our sketches.

Lioré et Olivier.

This firm exhibited a flying boat of very unconventional design as regards the boat itself and its cabin. The general impression of the machine, however, was that of very business-like construction. The boat was of the two-stepped type, the front portion having a vee bottom, while the part aft of the steps was of approximately circular section. Three engines provided the power, two of which were Hispanos placed between the planes, while the third was a Salmson, built into the nose of the cabin above the main flying boat



The Pierre Levasseur S.A.B. fighter : This biplane has the top surface of its wings covered with three-ply wood

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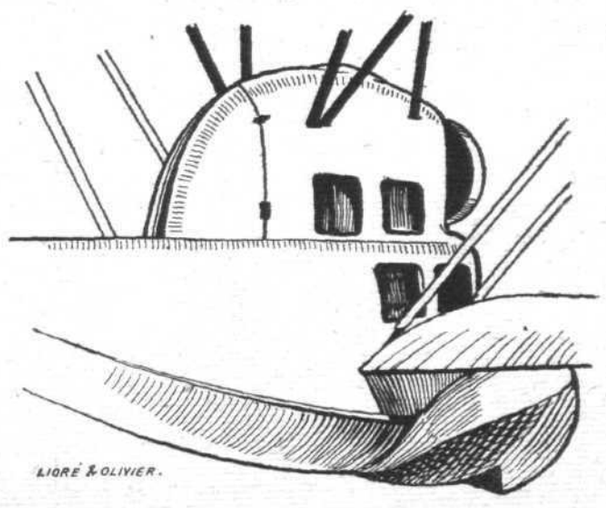
about 40 ft. diameter, which latter has not, we are authorised to state, been fitted on the de Marçay "Passe-Partout," this well-known French constructor is exhibiting two complete machines. One of these is a standard Spad, built under licence, a machine which is so well known as to need no reference here beyond the statement of its presence on the stand.

The other machine is a war type which was to have come to the front but for the signing of the armistice. It is a single-seater fighter with 300 h.p. Hispano-Suiza engine. The *fuselage* is of stream line form, covered with aluminium in front and fabric in the rear. The armament consists of four machine guns, two of which are mounted above the body and synchronised in the usual way. The other two are placed in the top plane, some little distance out, and are operated by Bowden control. Whether there is actually any more certainty of hitting the target with an arrangement like this is, perhaps, open to doubt, but as a means for ensuring that, even in the case of one or more guns jamming, firing can still be maintained the idea would appear to have certain advantages.

The engine is totally enclosed in an aluminium cowl, and there is a large spinner over the propeller boss. The radiator is of unusual design, being of annular shape and totally surrounding the nose of the machine, as shown in the accompanying sketch.



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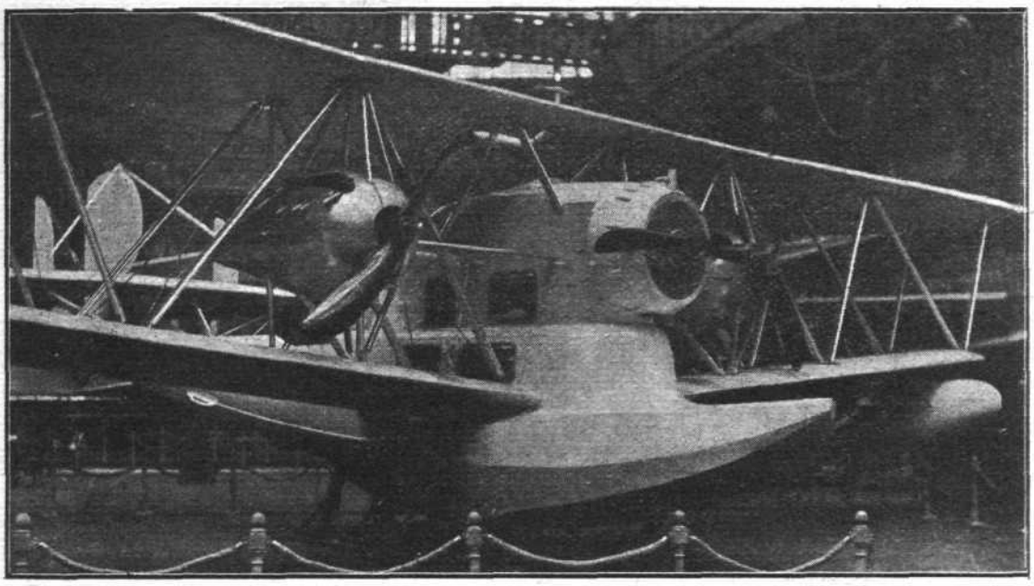
THE LIORÉ AND OLIVIER FLYING BOAT : Three-quarter rear view of the cabin, showing curved doors.



The Lioré and Olivier flying-boat : The hull is of most unusual design

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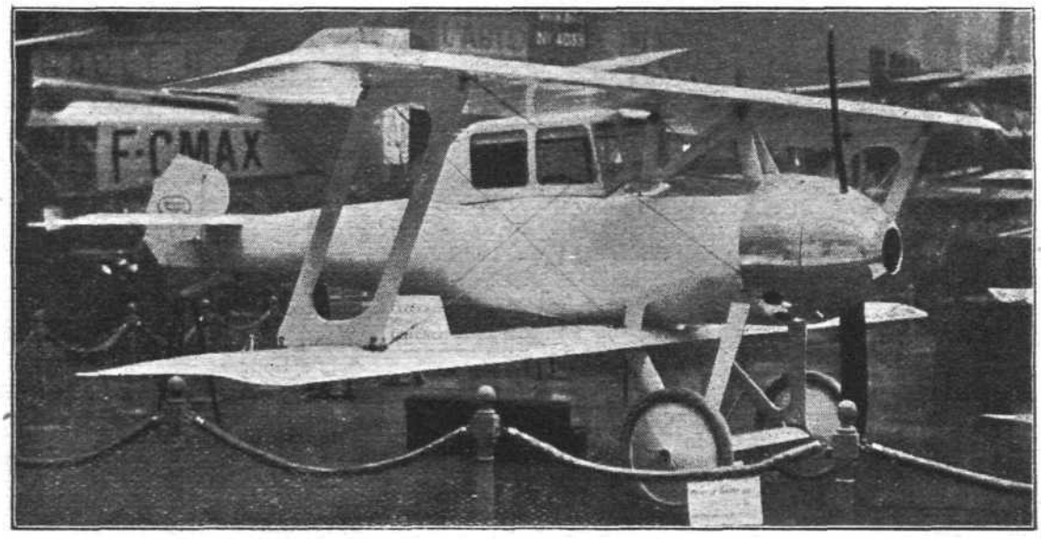
hull. Owing to its short length the Salmson engine does not take up much space longitudinally, and it has, therefore, been possible to fit it into the front wall of the cabin without encroaching upon the cabin space. Entrance to the cabin is through a door in the rear end, the two halves of the door forming, when closed, a curved edge as indicated in one of



The de Marçay two - seater, 60 h.p. Le Rhone engine : The cabin arrangement on top of the *fuselage* is easily detachable and was, we believe, fitted for show purposes only

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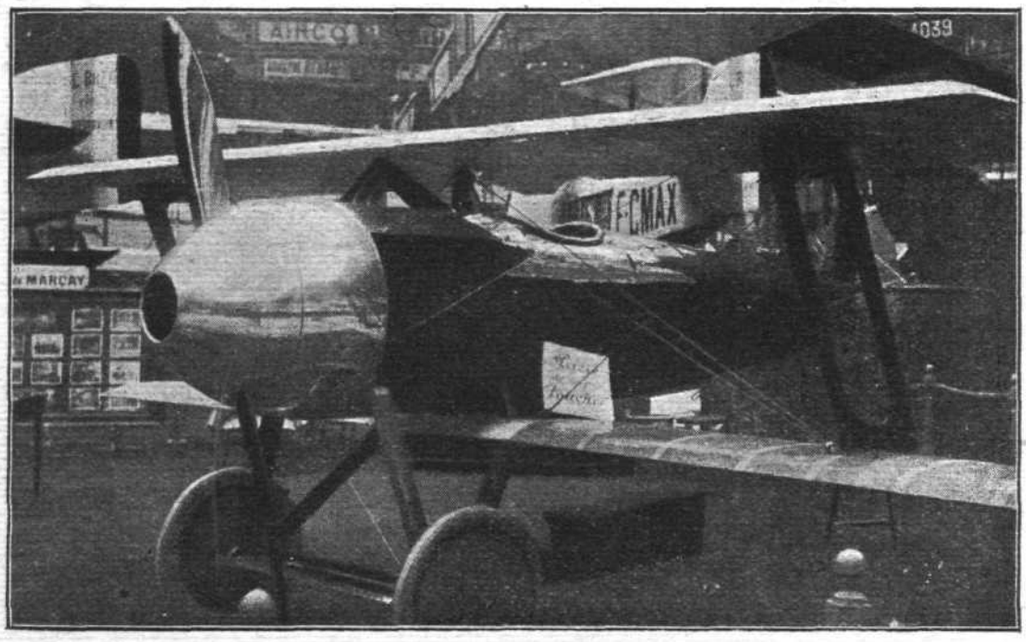

The de Marçay single - seater *monocoque* : This was a very pretty little machine

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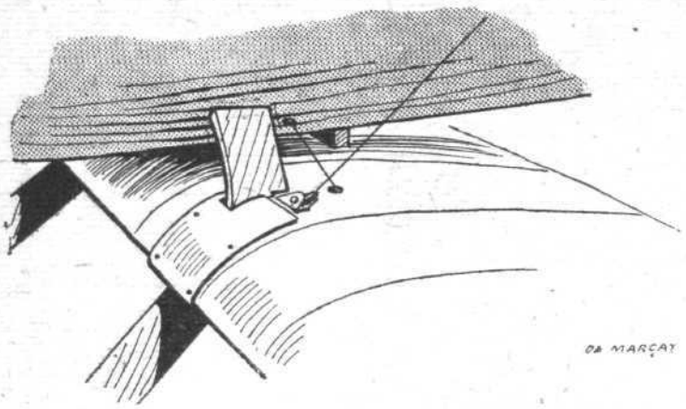

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THE DE MARÇAY SINGLE-SEATER, 60 h.p. LE RHONE: The bottom plane is supported from the body at three points, two on the front spar and one on the rear.

our sketches. The machine carries four passengers inside the cabin, and has, in addition, a useful load for mails, etc., of about 650 lbs. The pilot sits in a small cockpit let into the roof of the cabin, and a triangular opening is cut in the top plane in order to provide a view upwards. In principle the arrangement of cabin and engines, etc., would appear quite good; but the manner of carrying it out seems unnecessarily complicated with its many curves and joining of different surfaces.

The main planes are braced by sloping struts solely, the struts being arranged in the form of a Warren girder. The bottom plane is set at a very pronounced dihedral angle and carries wing tip floats of approximately circular section.

The de Marçay Engines.

Neatness was the predominating note in the three machines exhibited by Edmond de Marçay. This was partly due to the smallness of all three machines, and partly to the *monocoque fuselage* construction. One of the machines was a two-seater, with a detachable coupé strapped on to the top of an ordinary circular section *monocoque fuselage*. This coupé need not be taken too seriously, as it will probably be removed when the machine is going to fly. At a show, however, it looks quite well. The two occupants are placed in tandem, the pilot in front. The cockpits are arranged as in the ordinary open *fuselage* machine, and the fitting or removal of the diminutive coupé does not, therefore, interfere in the slightest with the permanent seating arrangements. The *fuselage* is of *monocoque* construction and circular section. The 60 h.p. Le Rhone is mounted inside an aluminium cowl, and there is a spinner over the propeller boss.

The main planes, which are of rectangular plan form, have a pronounced stagger. The top plane, which is in one piece, is secured to the body by a small *cabane*. The lower plane runs underneath the *fuselage*, to which it is secured at three points. The front spar has two points of support in the form of two short blocks of wood. Below the plane the two rear undercarriage struts are attached to the spars at the points where occur the two wood blocks; while inside the body, so placed as to correspond to the spar blocks, is a framework which also carries the engine. In this way landing shocks are transmitted to the internal framework without imposing any stress on the *monocoque* shell. The rear support for the bottom plane consists of a single wood block centrally placed.

There is only one set of struts on each side, these consisting of a rhomboidal structure which does away with the use of incidence wires. The tail plane is three-ply covered, and is of the lifting type, *i.e.*, it has a flat lower surface and a cambered top surface.

The second machine shown is very similar in general design to the one just described, the only differences being in the matter of seating arrangements and a slight decrease in overall dimensions. This machine, which also has a 60 h.p. Le Rhone engine, looks extremely neat, and should have a very good performance, since the loading/horse-power is comparatively low (9·7 lb.). It is a very pretty machine, and the price is fairly reasonable, about £475 at the present rate of exchange.

(To be continued.)

◈ ◈ ◈ ◈

THE COSMOS 100 H.P. "LUCIFER" ENGINE

SOME very thorough tests have been carried out with the new three-cylindered Cosmos "Lucifer" engine—some particulars of which were given in our issue for Dec. 25th last—during the last six months. The original engine, which has now run a hundred hours, has been installed in an Avro biplane, and has given very satisfactory results, the performance of the engine at all speeds being very good. There is practically no vibration, in spite of the fact of it being a three-cylindered engine.

Tests have been made with cutting out one individual cylinder in turn, and although such a test is extremely drastic, and the torque of the engine is upset, it is possible to go on running the engine in the event of an accident of this nature.

The oil and petrol consumption is excellent, viz., .6 pint/b.h.p./hour—petrol consumption; .02 pint/b.h.p./hour—oil consumption.

This consumption can be consistently maintained both on the bench and in the air.

Special attention should be drawn to the fact that dual ignition, dual plugs and dual oil pumps are fitted to this engine, and that a hand starter is also fitted as a standard.

Another important point in connection with this engine is that carburation on induction pipe system has been arranged to meet the latest provisions of the Airworthy Certificate, viz., that carburettor intake pipes and heater pipes to carburettor must be entirely outside the *fuselage*.

◈ ◈

The Prince of Wales and Empire Aviation

THE Prince of Wales, who has recently become Vice-Patron of the Royal Geographical Society, will be present at the meeting of the society on Monday, February 2, at the Central Hall, Westminster, at 8.30 p.m., when a paper will be read by Maj.-Gen. Sir Frederick Sykes on "Air Routes of the Empire."

A Gift to Canada?

FROM a statement attributed to Maj. Donald McLaren, D.S.O., D.F.C., who has been largely concerned with the work of the Canadian Air Board, it appears that next spring Canada will have 100 war machines given by the British Air Ministry.

Aircraft and Wireless

ARRANGEMENTS are being made to establish a central wireless station under the Air Ministry for the collection of intelligence as to the movements of travelling aircraft and the meteorology of the upper air. The main exchange is at present in the offices of the Air Ministry at India House, Kingsway, where only aircraft messages are received, all others being "tuned out." The new station will probably be near Croydon. A network of similar stations is to be extended throughout the country.

The Vickers "Vigilant"

THE news that Messrs. Vickers, Ltd., are engaged upon the construction of a new machine—to be called the "Vigilant"—has just reached the daily Press. As the machine is for the R.A.F., details are naturally not available, but it is stated that the machine will have eight 700 h.p. Rolls-Royce "Condor" engines and be capable of carrying up to 100 passengers.

Bombay-Karachi Aerial Mail

ARRANGEMENTS have been made for the inauguration of a weekly aerial mail service between Bombay and Karachi and *vice versa* in connection with the English mail. Letters should have the words "Bombay Karachi Air Service" written in the top left-hand corner, and the special fee is 1*s.* for each ounce or fraction of an ounce, in addition to the ordinary postage. The letters may be posted at any post office in the U.K.

The Paris Aero Show at a Glance

IN the table of particulars published under this heading in our issue of January 1, the last column was, owing to a printer's error, headed Load/h.p. This should have been Load/sq. ft. We much regret the mistake, which was, however, obvious, as the previous column was headed Load/h.p.

FLIGHT
AIRCRAFT ENGINEER AIRSHIPS

AIRCRAFT IN WAR AND PEACE

RECENTLY there have appeared in *The Times* several letters dealing with the future of commercial aviation in this country Inspired by the opening up of the Cape to Cairo route, "Ex-Squadron Commander," in pointing out the importance of aviation to the British Empire, said :—

"But let us not forget that for the present the destruction of the Senior Partner in this great firm would mean the destruction of the whole. It is within these islands, as much as to the farthest outposts of Empire, that development in the air must take place."

He went on to controvert a statement in the *Aerial Year Book* for 1920 that "where the journey is entirely by land for distances up to 300 or 400 miles there can be but little to choose between train and aeroplane." He gave several examples which illustrated the advantage of the aeroplane, especially for cross-country journeys, and pointed out that when it was decided to change an airway there was no permanent way to shift. Asserting that at present ground organisation does not exist, he urged that the State should establish a model airway with the necessary lighthouses, signalling stations, &c.

After castigating the Admiralty for their neglect of opportunities for torpedoing the German fleet by the aid of aircraft, etc., "Ex-Squadron Commander" drew attention to what is being done to support commercial aviation in France, Italy, United States and Germany, and urged that we should encourage the formation of a mercantile air fleet.

Mr. G. Holt Thomas, the great commercial pioneer in the world of aeronautics, followed this with two letters in which he set forth in a most able manner a scheme to create a solid basis for real commercial aviation, and at the same time, secure the nucleus of a strong and mobile military reserve against all emergencies. In his first letter Mr. Holt Thomas wrote :—

"I have read with great interest the sane and intelligent letter by 'Ex-Squadron Commander.' Perhaps I have been somewhat responsible for the statement that it would be very difficult, indeed, to develop civil aviation within these islands, but I am not ashamed to say that I have changed my mind for two reasons. First, for the reason that I have just seen that the proposed permanent organisation of the Royal Air Force is to provide a striking force of only two squadrons for the year 1920-21, to be increased to four squadrons in 1921-22, 1922-23. Secondly, I have rather a different opinion now, because we have run a daily air service between London and Paris, and have seen actually what the aerial mail, even with a limited organisation at our command, can do.

"To anyone seriously apprehending attacks from the air it is apparent that if our 'striking force' is to be only four squadrons, aviation for defensive purposes must be developed in some other way. It is strange that immediately after the War the successes which aircraft gained during the War have been almost entirely forgotten; and it is not sufficiently appreciated that what aircraft did during the War was nothing more than a small indication of what might have been done. The aerial policy of this country, as laid down by Lord Weir, never had time to come into force. It would only have matured had the War continued for another year.

"But, at the same time, it is astounding to me that the British public has so soon forgotten the effect of even the very feeble air-raids which were delivered against this country."

Mr. Holt Thomas then pointed out what happened during those air-raids—when we had an anti-aircraft defence requiring a skilled organisation—and asked what would be the result of a sudden attack by such a force of aeroplanes that the defence would be practically helpless. He went on :—

"Within the last few days I have been discussing this very matter in a large manufacturing city in the Midlands, where, during the War all lights were darkened, and were often turned out completely on warnings of threatened raids. There was not one of the business men with whom I talked who did not agree with me that, given half-a-dozen aeroplanes, dropping the latest type of bomb, I could have completely laid waste that city, destroying not only all its communications, but also its key industries. Not one man, as I say, disputed the fact, the only question being: 'Was any such attack probable?'

"'Ex-Squadron Commander' has rightly drawn attention to the number of aircraft being used in other countries. If it was decided that war was impossible I should be the last, of course, to suggest the maintenance of a large number of aircraft and the continuance of our aircraft-designing departments for defensive purposes. But it has not been so decided. A large navy and a large army are to be maintained, and yet neither of them is of any use against the most likely form of attack in the future, namely, a sudden and overwhelming attack by air. Nor can the navy or army carry out their duties effectually without the assistance of aircraft.

"It might be assumed that, as an aircraft manufacturer, I have selfish interests. But I can readily disabuse anyone's mind of this idea. We have no difficulty at all in filling our factories with work other than that connected with aircraft. But what, it may be asked, is happening to the aircraft-designing power of this country? This is the critical question. It was demonstrated during the War that the aircraft-designing power of Great Britain was second to none, and the designs employed during five long years of war came from the few pioneer firms in this country. It is quite apparent, of course, that with the large stock left over from the War aeroplanes are not likely to be required in the near future in anything like quantities. But, as a matter of fact, no such orders are required to maintain design. The distribution of, say, one million pounds sterling among the aeroplane-designing firms for experimental machines would go a long way towards the maintenance of their designing staffs.

"The question would then remain as to how to maintain a sufficient number of aeroplanes in flight, with the necessary pilots, mechanics, and other *personnel*. This could be largely solved by the frank adoption by the Government of aeroplanes as a means of swift transport between our great cities in this country. The development of civil aeronautics in our Dominions overseas is certain; but now, when I see what our proposed air force of the future is to consist of, I am heartily in agreement with 'Ex-Squadron Commander' that it is within these islands that the development of civil aeronautics must take place.

"If we choose to forget our experience during the aerial attacks of the War, in the days when we had a huge defence, there is nothing more to be said. If, on the other hand, we do fear attack—and presumably by the continuance of a Navy and Army such attack is feared—then the maintenance of an aerial force in this country must be arrived at in one of two ways. The necessity for economy being evident, the first way to maintain aerial power is to decide the relative importance of Navy, Army, and Air Force, and, out of the sums allocated for these services, to examine the position again, and decide whether we have attributed sufficient importance to the air. The second way is by the definite support of commercial aerial services throughout the country."

In his second letter Mr. Holt Thomas propounds his scheme :—

"I should like to draw attention to the statement made by Lord Weir during the course of an interview with him which appeared in the *Weekly Dispatch* of Sunday last." *

"I promised to propound a scheme by which, through a national encouragement of civil aviation, the aerial power of this country might be ensured. To do this, it is necessary for me to disclose some of the secrets of our London-Paris

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* [The following is the full text of the interview with Lord Weir.—ED.]

"Certainly the current Air Estimates of fifteen millions as compared with a hundred and fifty millions for the Navy are eventually destined to be radically revised. The next war, if there is a next war, will be largely an air war.

"It will perhaps be begun and certainly ended by the Power which can strike first and hit the hardest in the air. The British armament expenditure is therefore bound to undergo a complete revolution henceforward.

"The world was merely on the threshold of aerial possibilities in war when the Armistice was signed.

"It is safe to predict that next time the aerial wonders will far outstrip anything hitherto known.

"The Atlantic, for example, has been crossed and re-crossed by both types of aircraft. The vast expanse between Britain and Australia has been bridged. From these experiences the personnel is calculable only in tens of thousands, which will forthwith be available.

"As Britain undoubtedly requires to remain an Air Power of the first magnitude, it is obvious that we must be prepared for an unprecedently enormous expenditure.

"It will be exceedingly difficult as it is surely impracticable, to maintain the so-called proposed control over German air armaments.

"We can watch them, but cannot figure out how we are going to regulate them. I have not a very profound faith in the efficacy of the inspection commissions or things of that sort. We must seek our own salvation in adequate preparedness."

. air express.' We have proved, over the most difficult route in the world climatically, that the reliability obtained is sufficient for the service to be of real value to the business communities. The charge for a letter conveyed by aerial mail from London, and delivered by hand in Paris, is 2*s.* 6*d.* ; and it is evident that, even at this charge, the advantages in time-saving are such that the fee is cheap rather than dear. In about four hours a letter can be transported from the sender to its final destination ; and, should it be decided by the Government that aerial transport is to be encouraged in a more practical way, the provision of a pneumatic tube, or some other rapid means of conveyance, from the G.P.O. to the aerodrome, would enable a letter to travel from the Post Office in London to the Post Office in Paris in only about 2½ hours.

" That the existing experimental charge of 2*s.* 6*d.* is not dear can be appreciated by a comparison with the cost of a telegram—which, I may mention incidentally, often takes as long as a letter to complete its journey between London and Paris. For a charge of 2*s.* 6*d.*, 13 words only, including the address and the signature, can be sent by telegram ; whereas by aerial mail thousands of words may be sent—an explicit letter, in fact, duly autographed, and containing, if necessary, photos or drawings. There is, indeed, no question as to the value of the services rendered by the air express. An air-borne letter delivered by hand in Paris for 2*s.* 6*d.* compares with, say, a letter delivered by hand between *The Times* office and Hampstead.

" While the charge of 2*s.* 6*d.* for carrying a letter by air for 250 miles at 100 miles an hour gives splendid value for money, the point arises at the same time that, if one seeks to show how aerial services might be operated generally throughout this country, it is very necessary to indicate what might be done to reduce such experimental charges as are imposed today. The whole situation could be altered in a moment if it was decided to encourage the extension of the air-mail by giving contractors for these air-lines a guaranteed load to carry day by day. Let me take, as an example, London-Paris. Over this distance of 250 miles we should be prepared to carry a guaranteed load of 400 lbs. of first-class mail matter at a charge of 4*s.* per lb. This, taking the weight of average letters to be such that 35 of them go to the pound, works out at one penny and a third per letter. If we had a guaranteed load of as much as 600 lbs. we could carry this at the rate of 1*d.* per letter ; while if the weight of the load was increased to 800 lbs. the price could be reduced to ¾*d.* per letter, and so on.

" These figures, taking into account the fact that transport would be effected at 100 miles an hour, impart, I think, an entirely different atmosphere to this question of commercial aeronautics. They show, in fact, that the aeroplane can not only do something which no other means of transport in the world can do, but that it can also do it at a very low price. I should like also to emphasise the point that these charges refer to high-speed machines, as I hold that speed is the whole essence of aerial transport. If slower machines were used the rates could be even further reduced.

" Now one comes to the crucial point. How, bearing two main objects in view, can the Government support aviation ? First, there is the need to maintain a large flying force, so that it should be available in emergencies, and, secondly, there is the desirability of giving the people of this country a more rapid system of communication. Personally, I see no reason why, as a first practical step, the Government should not ordain that all first-class mail matter between London and Paris is to go by aeroplane—the postage to be 3½*d.* instead of 2½*d.* By such a step the authorities would not only support aviation, but they would also make a profit, and I feel certain that no business man, in view of the services rendered, would object to the penny surcharge. The advantages of the London–Paris air service extend, I should point out, far beyond these two cities. Letters today, if they travel by air between London and Paris, catch mail trains in Paris that same night which enable them to reach such cities as Rome and Madrid 24 hours earlier than would ordinarily be the case.

" Now let us imagine a further step. Let us assume that it is ordained by the Government that all first-class mail matter is to be conveyed by aeroplane, say, between London and Manchester, the postage in this case being 1½*d.*, plus ½*d.* surcharge, or 2*d.* complete, and with varying rates, according to distance, between Manchester and Plymouth, Edinburgh and Liverpool, and so on all over the country. This is a form of taxation certainly, but so is the raising of the price of the inland postage from 1*d.* to 1½*d.*, and of the inland telegram from 6*d.* to 9*d.* So, also, is the price of coal, and the increased railway rates. But in the case of aerial transport there is this vitally important point. If what I suggest was done one of the main results, apart from the provision of more rapid transport, would be the establishment of a form of national insurance against what might be one of the most appalling disasters which could possibly befall this country, namely, a sudden and successful invasion from the air.

" ' Ex-Squadron Commander ' drew attention in his letter to an important fact. Although communication between London and other great cities is excellent by the ordinary means of transport, some of our cross-country journeys, even in this small island, continue to be quite unreasonably difficult. On many occasions, indeed, it is quicker to come up to London and then travel down somewhere into the country again rather than attempt a cross-country journey. The aeroplane could score heavily here ; but it must be by order of the Government.

" I see no reason now, why this new and swift means of transport should not be adopted by the Government, and the fees charged fixed by official authority. The Commissioner of Police orders that we pay 8*d.* a mile for a taxi, as contrasted with 1*d.* for a motor-omnibus. The Government says a telegram shall cost ½*d.* per word, as compared with a letter containing, perhaps, thousands, for 1*d.* And for national reasons they do not hesitate to add another ½*d.* What the Government would have to say quite frankly to the public is this : ' We now have a quicker means of communication at our command. It is slightly more costly, but actually cheap for the services rendered. We have, in addition, decided that its development is vital to the safety of the country.'

" By this means the whole country from Land's End to John o' Groats might become a network of aerial ways. Once adopted it would be quite easy for a Government to ordain that, in consideration of a certain fee, every aeroplane employed on Government contract work should carry a machine-gun mounting in a certain position. For a further fee it might be fitted with a bomb-dropping apparatus. By this and other obvious means a very large fleet of aeroplanes with an army of pilots and mechanics might be maintained, the aircraft industry of this country might be preserved, and our defence against aerial attacks rendered secure.

" All this could be done practically for nothing, and when I use this word ' nothing ' I mean it. If it is once recognised that rapid communication is the soul of industry, then the small extra charge for such an increase in rapidity as could be obtained by air does mean literally nothing. It is not a subsidy, that is to say : it is merely a payment for services rendered. And on the figures I have given I think I can claim to have proved that the charge for aerial transport is very small indeed, having regard to the increase in speed obtained.

" Aerial transport, in its first commercial development, might have proved all sorts of things. It might, for example, have proved that, while it could be dependable enough, the cost was prohibitive. What I think we have proved is exactly the opposite. We have not only proved our reliability, but we can now show that, given sufficiently large uniform loads, we can provide 100 miles an hour transport at a charge which is extraordinarily small. With a guaranteed load a letter could be delivered from London to Amsterdam, and *vice versâ*, at 3½*d.* a letter in 2½ hours instead of 15 hours. Surely there is no question of subsidy in this extra penny. It is amazingly cheap for any form of transport which can so revolutionise business between two great cities.

" The fact needs bearing in mind that we, in this country, are almost alone in the attitude we are taking up officially towards civil aviation. The French Government pays so much per kilometre for every flight, and, in addition, a postal rate ; while, so far as one can see, in nearly every other country subsidies or payments will be made. This, personally, I think, is a mistake which we can prove, as we now can, that the purely commercial charge for an express air service can be brought so extraordinarily low. I object to the word ' subsidy ' ; but at the same time the Government must take a decided step to encourage the use of aeroplanes for transport ; and the most practical way seems to be the one I have suggested. I claim that it would be no disadvantage, but, on the contrary, a great advantage, to the business community of London, if the Government were to state that it intended to send all first-class mail matter by aeroplane in future, and that the charge would be 3½*d.* instead of 2½*d.*

" In no way, except by aeroplane, could a business man in Newcastle send off a letter at noon which would be delivered to a London correspondent during business hours that same day. Further afield, although this is departing from the question of inland mails, the advantages seem to be so obvious that the Government should have no hesitation at all in coming to a decision. An aerial mail service between Cairo and Karachi would save a week in the transport from London

of the Indian mails; and it seems to me an obvious thing to decide that, when this line is established, all first-class mail matter shall go by it, and the charge shall be an additional 2½*d.*, or some fee of this sort. Such are the methods by which civil aviation can be established firmly.

"Every means of transport depends on its load. When we have proved, as we have, the extraordinary rapidity of the aeroplane and the low charges for which its services can be secured, surely it is a small thing to decide that it shall be employed regularly, and for the benefit of the whole community, especially when, in addition to the fact that all its commercial advantages can be obtained at a perfectly commercial price, the whole security of this country is dependent on our maintenance of an aerial power which shall be ready instantly, fully equipped, should any attempt be made to invade us from the air and to paralyse—before we could defend ourselves or retaliate—all our communications and key industries."

SUMMARY OF RESULTS OF R.A.F. MAIL SERVICES

SOME interesting detailed statistics are now available regarding the six months' running of the Folkestone-Cologne mail service which was terminated towards the end of October.

The actual cross-Channel service was inaugurated on March 1, and was the development of various mail delivery services which had for some time previously been in operation in France and Belgium. Prior to March 1 the mails were shipped to France and taken by ground transport to the aerial distributing centres. These services, however, were not carried out regularly for any lengthy period over particular routes, but were constantly being changed as the movement of troops and progress of demobilisation rendered necessary. It is, therefore, not possible to give any detailed and useful statistics for the period before March 1, but it is of interest to note that out of 1,023 trips commenced only 45 were uncompleted from any cause. This represents an average percentage of successful flights of not less than 96. If the fact be borne in mind that all these flights took place over difficult country and in the bad weather of the winter months, December to March, this result is particularly good.

Three squadrons were at first employed on the cross-Channel service—Nos. 18, 110 and 120, equipped with D.H. 9A, D.H. 9 and D.H. 4 machines.

From March until July the mails were not usually carried direct from Hawkinge to Cologne, but were flown from Hawkinge to Maisconcelle (later on Marquise) and there transferred to other machines for Cologne.

Neither Maisconcelle nor Marquise, however, were halfway stages, both being considerably nearer Hawkinge, so that the longer and more arduous portion of the journey, including that over the range of high hills between Lille and the German frontier, had to be negotiated by the pilots of Nos. 110 and 18 Squadrons at Maisconcelle and Cologne respectively.

The distance from Hawkinge to Maisconcelle was roughly 67 miles, and from Maisconcelle to Cologne 229 miles—a total distance of 296 miles, against 250 miles over the non-stop route adopted later. The average time for the first stage was one hour, and for the second two hours and a quarter.

From July 22 the squadron at Marquise ceased to operate, and the through service between Folkestone and Cologne was thenceforward regularly flown until the termination of the aerial mail. Even before that date many individual through flights had been successfully made.

During the six months flying subsequent to March 1, 1,842 trips were made, comprising rather over 3,000 hours in the air. Up to 460 lbs. weight of mails were carried per machine trip.

Of the 1,842 flights begun, 96 per cent. were successfully completed. Of the 4 per cent., the percentage of flights which failed, slightly over 2 per cent. were due to engine trouble or mechanical defect, and under 2 per cent. to bad weather.

Of the through flights from Folkestone to Cologne of 270 begun 267 were completed, or only 1 per cent. of failures.

The regularity of service was also good. Mails were carried from Folkestone on 146 out of the 182 days under review, and from Cologne on 139 days. The percentage works out at 80·2 per cent. and 76·4 per cent. respectively. The times of departure of the aerial service were fixed so that in the event of the weather being impossible for flying, the mails could be sent by rail or boat without delay.

A striking feature of this service was its immunity from casualties. During the six months covered, only one pilot and one passenger were injured, both in the same accident.

Although this service has provided valuable data on many of the points which arise in the working of a commercial service, it has been found impossible for various reasons to deduce actual running costs per lb. of mail carried. For instance, the total possible load of the machines in use was 600 lbs., but not more than 460 lbs. were ever carried in one machine and very often considerably less; and again, each machine available was not employed as regularly or as frequently as it would have been on a commercial service.

The figures would not, therefore, have represented true values for the cost per ton carried.

The London-Paris Service

Details have also been prepared of the London-Paris service for the same period.

This service was carried on by two composite squadrons, one at Hendon—afterwards moved to Kenley—and the other at Buc, near Paris. The machines used on this service were chiefly D.H. 4's, but Handley Page, Martinsyde and Bristol Fighter types were also employed—all the machines being fitted with Rolls-Royce engines. This service differed from the Cologne service as being primarily for passenger work though official mails and despatches were also frequently carried.

The total number of trips made from the commencement of this service to the end of August amounted to 744, while 934 passengers and 1,028 mail-bags were carried. A certain number of these flights were to various other French or Belgian towns; 90 per cent., however, were to Paris.

Of the flights made between March 16 and the end of August, 556 were completed and 52 failed; 13 on account of weather conditions and the remainder owing to mechanical defect or engine trouble. The percentage of successful trips, therefore, amounted to 91.

In this service machines were not working to their full capacity. Naturally, owing to this fact, the resulting cost (which was obtained for another purpose) is higher than would otherwise have been the case, but the data so obtained are interesting and valuable as roughly indicating the possibility of commercial aviation as a paying proposition, though it has not been possible to work out the costing in great detail.

In arriving at these figures allowance has been made for depreciation on buildings and plant of 5 per cent. per annum on original cost, as well as rates and upkeep. Depreciation on the machines employed has been charged for the one month's running under review at one-twelfth of their initial cost, thus allowing a complete write off of each machine in one year, while that on engines has been taken at one-thirty-sixth of initial cost, allowing lifetime as three years. This, of course, is in addition to the full charges for all personnel employed and all stores consumed.

Taking the average weight of a mail-bag as 25 lbs., and of a passenger as 100 lbs., and working on the figures of May as being a representative month on this service, the actual cost worked out to 1*s.* 0½*d.* per oz. per 205 miles—the actual distance between Kenley and Paris.

During the six months there were five accidents on the service in which three pilots and one passenger were killed, and two pilots and one passenger were injured.

Taking the combined results of the two services it appears that of 2,450 trips begun since March 1, no less than 2,331 were successfully completed, the proportion of failures amounting only to 5 per cent., the percentages due to weather and mechanical defect being 2·8 and 2·2 per cent. respectively.

As the early months of this period provided particularly bad weather this result is satisfactory.

New Year Honours

AVIATION was represented in the New Year Honours, published on January 1, by the K.C.B. conferred on Sir Richard T. Glazebrook, C.B., F.R.S., late Director of the National Physical Laboratory, and the C.B. conferred on Mr. Charles R. Brigstocke, Assistant Secretary of the Air Ministry. Sir A. Trevor Dawson, M.I.C.E., M.I.M.E., R.N., who is so closely identified with the aeronautical work of Vickers, Ltd, is created a Baronet for his public services in connection with Home Office, War Office and Admiralty work.

AIRISMS FROM THE FOUR WINDS.

WAS it by accident or a coincidence that ex-Kaiser Wilhelm, who wept so copiously at even the thought of his henchmen insisting upon bombing London, selected Amerongen (Am a wrong 'un) for his exiled residence? Or was it a subtle form of breaking-it-by-degrees confession? We wonder!

QUITE a lot is being made in one direction of the badness of the rules governing the Air Ministry competitions. It is quite true they are not all they might be and this is not *very* surprising having regard to the entirely novel problems which have to be faced in all matters concerning the navigation of the air. At the same time they are nowhere near as defective or harassing as it is sought to imply. That they will in certain details be further adjusted to suit eventualities is not only probable, but most likely. One point put forward as damning first and last is that so far no entries have been made. Again, it's not so bad as might appear. Formal entry certainly has not been made, but before the closing date for receiving these, it may be found that this first and final argument has been neutralised. Therefore is it wise to wait awhile and see. In regard to aircraft engines these will probably not be treated as a "side-line," but will have a show all to themselves.

AT last a start has been made to elaborate the placing of names of towns and localities on the station roofs throughout the country. In time every station in the United Kingdom should be so adorned for the benefit of pilots.

IT is to be hoped the lectures for teachers upon "Recent Development in Science," which have been arranged by the L.C.C., will be well patronised by those for whom this highly interesting series has been initiated. By way of an example on January 13 next the subject will be "Aviation," when Lord Montagu of Beaulieu will expound his views upon this fascinating science. The meeting will be at King's College, Strand, and the chair will be taken by Maj.-Gen. Sir Frederick H. Sykes.

LAST week was recorded the performance of M. Pillon, the French pilot, who at a height of between 300 and 350 yards looped the loop 29 times in five minutes. Now we're waiting for the "record" at a couple of yards above *terra firma*.

THOSE Mahsuds apparently *have* had enough at last. As we said, *nous verrons*.

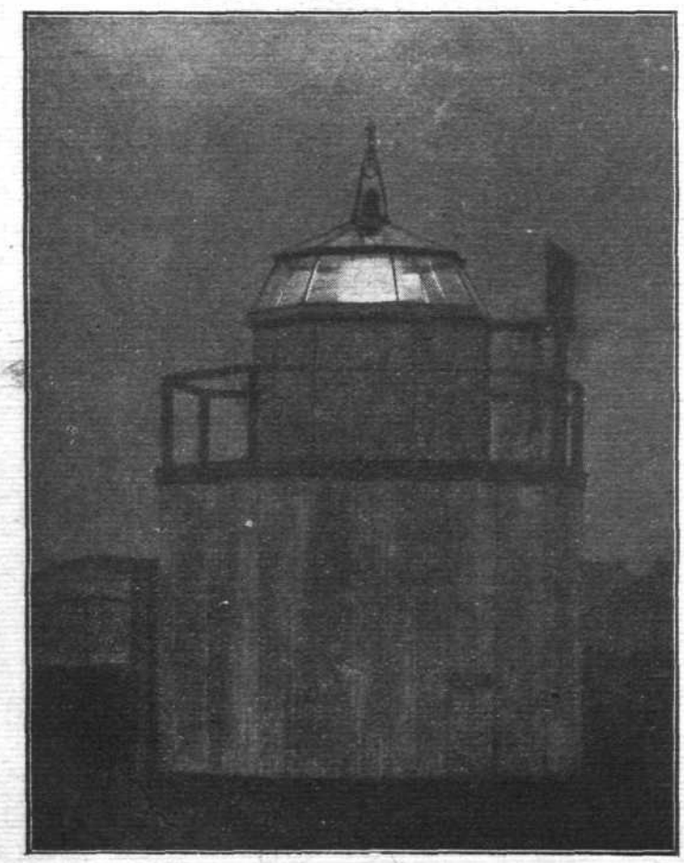
FRANCE looks like profiting by her Spanish neighbours' desire to be in the front in aerial progress. By a decree published in the Madrid *Gazette* of last Saturday, the Spanish Post-master-General is authorised to contract with a French aviation company for the aerial transport of correspondence between Barcelona, Alicante and Malaga, and between the latter town and Algiers. We hope our British constructors will not let too much of this rich Spanish "mine" miss their net.

IN quite another direction the aeroplane is being brought into use by France. By this means gold is being transported from the mines at St. Laurent du Maroni, French Guiana, which is separated from the coast towns by a 100 miles' belt of almost impenetrable forest. The first trip was made successfully last October. Hitherto the gold has been taken down in canoes and by porters.

AS the world now knows, the Rolls-Royce car firm have, through the hustling enterprise of Mr. Claude Johnson, the managing director, established a branch of their company in America to manufacture that super-excellent car for which the company are world famous. It will be one more demonstration of British supremacy in regard to quality. Mr. Claude Johnson rightly thinks that Britons are far too modest in speaking of their own achievements, and it might well be that in these days we should take a leaf out of our American allies' book in respect of removing the bushel from over our candle. "I don't think," says Mr. Johnson, "we are half proud enough of our engineering ability. Had the Atlantic flying feat and the flight to Australia been carried out by any other nation than our own they would have been boomed tremendously as great national achievements. Here we have adopted such things almost as a matter of course. The success achieved is a tribute not only to British designers and manufacturers, but to the mechanics. Probably 80 per cent. of aerial failures are due to faulty assembly of parts, and when you get two great flying records established without mishap, it indicates the worth of the workman."

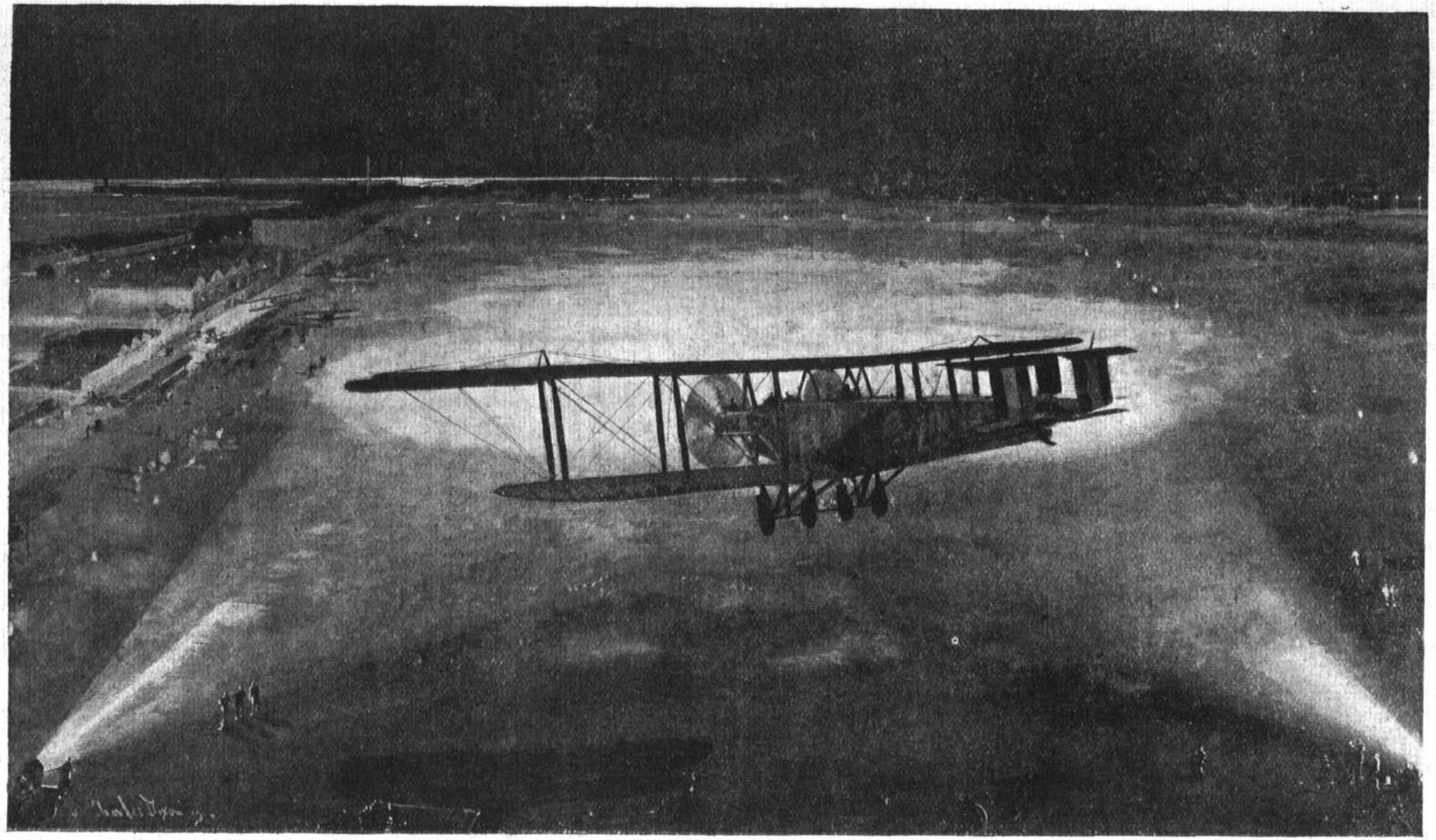
So now, all ye constructors of superlatively high-grade goods, go thou and do likewise across yonder, so that—an' our cousins insist on sending us vast quantities of low-priced cars and what not—we can retaliate by teaching them what British-made really means, as understood in the home of the Briton.

ONE thing we certainly *have* got to get down to business in this country a bit better than has been our wont of past years. That is the hustling to return our railway wagon rolling-stock as quickly as ever it be possible. What with increased wages and costs in every direction, the accumulating delay and shortage brought about by traders and others not "clearing" their trucks promptly is becoming a menace to our economic transport and railway working. Possibly the increased demurrage will have a leavening effect, but that by itself is of little use without the whole-hearted co-operation in a hustling spirit of the traders of the country. Therefore for patriotic as well as selfish reasons do we wish to draw special attention to an announcement upon this vital subject which appears in our advertisement columns this week. As



"Flight" Copyright.

The new experimental aircraft "Lighthouse" installed at Hounslow Aerodrome.



A NIGHT LANDING : An impression by Charles Dixon, R.I., of a Handley Page biplane landing on an aerodrome after dark.

In 1914, when the question of night flying had to be seriously considered, the " Imperial " lights, which are an acetylene stormproof flarelight, were supplied by Imperial Light, Ltd., 123, Victoria Street, Westminster, S.W. 1, to both the Admiralty and War Office, and to the French Government, for the lighting of aerodromes for this purpose, but as the development of night flying took place, it was found that a much more efficient spread of light had to be obtained to enable satisfactory landings to be made. In an extremely short space of time after having been consulted by the Air Ministry, the " Imperial " night landing lights were designed, and proved so superior to any other form of apparatus for the purpose, that a large contract was placed, and all the most important aerodromes were fitted. Further experiments carried out by Imperial Light, Ltd., have resulted in the latest pattern of night landing light being a complete unit in itself. As the light and all the necessary apparatus for its maintenance are mounted on a trolley fitted with 700 by 1,000 mm. aeroplane wheels, the light can be run to any part of an aerodrome, set going in two or three minutes, to enable emergency landings to be effected. Mr. Dixon, in his picture, has selected the moment when an H.P. is about to land, by the aid of this apparatus.

it is there put, "Keep British trade moving." Read, mark and learn, and let this be our motto, one and all.

* * *

ONCE more Mr. H. Prevost Battersby has set out his very honest and well-meaning protestations in regard to the possibilities and terrors of War from the Air, if the prohibition of aviation altogether is not insisted upon by Civilisation. This time Mr. Battersby holds forth in the *Sunday Chronicle*; last time it was in the *Morning Post*. But the song is the same, if a bit more pronounced in tone. It is simply that the possible horrors to which aircraft may subject the peoples of this world are, in the hands of a ruthless enemy, so appalling that it were better to forbid, lock, stock and barrel, the art of flying for now and all time, so that if "all adventure in the air were absolutely forbidden by the League of Nations, no engines could be tested, no pilots trained and, if war should be deferred for a generation, there would be none left who knew how to fly, and no possibility of surprise, which is the thing we have most to fear, since the first appearance of any craft in the air would advertise the contumacious nation's intentions."

* * *

BUT how on earth does Mr. Battersby suggest this injunction should be backed up, except by hefty armaments (and that at once and primarily means war aircraft). By the time protest is necessary to the "contumacious nation" the assumption is that the delinquent himself would be ready and —well—what then, if the "forbidders" were *not* in such strength as to force compliance with their "instructions"?

* * *

MR. BATTERSBY puts it that "it would be wise for any future Council of the Nations to curtail mankind's capacity for mischief by forbidding, under the extremest penalties, the construction of every sort of aircraft."

Gee-whizz! About as effective as forbidding the burglar to burgle or the murderer to murder, even under the penalty of somebody threatening to get angry with them, and expecting such methods once for all to so entirely change human nature as to eliminate for all time from this erratic sphere of ours the occupations of burglar and murderer. Nobody can help but have the most acute sympathy with all Mr. Battersby's points, but it won't do, as civilisation is just now. And it looks like, from internal strife, being worse if anything. Again, as we said when Mr. Battersby went off the deep end before, every word he writes in this vein is and must be but an incentive to go one better, and to see that, when it is necessary to issue an ultimatum, it is Great Britain that is in the position to enforce the "request," on behalf of civilisation, by power indisputable. And so long as that is made clear to the world it will spell once and every time Peace, and Blessed Peace.

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How far the carrying out of Mr. Battersby's ideals are possible through the much to be desired League of Nations, may well be illustrated by the following extract from the War Minister's (Mr. Winston Churchill's) speech at Sunderland last Saturday upon the hopeless prospects of this impossible body under present conditions.

"In regard to the League of Nations, it is the last point I shall submit to your attention, that the difficulty which a number of Allied States, although they are fresh from the comradeship of a long struggle, have found in arriving at any clear, wise, united and concerted policy on many of the great questions of the hour, that these difficulties are a very discouraging augury for the future of the League of Nations. I see that Lord Robert Cecil, who has been making many good speeches, at Manchester, has lately reproached me for not being a sincere supporter of the League of Nations. That is unjust. I am sure all of us are agreed that a League of Nations to keep the peace and prevent a repetition of the fearful calamities which we have suffered is a plan which every one of us ought to support to the best of his ability. Further, I have always been very much impressed by the argument which General Smuts used in his brilliant Memorandum that, in the course of the War, all the higher organisations of the peoples of Central Europe had been destroyed, and that, as we had taken them away, it was our duty to put another central organisation in their place, without which the development of these great masses of human beings could not possibly continue.

"But it is no use dealing with illusions and make-believes. We must look at the facts. The world in which we are living is too dangerous for any one to be able to afford to nurse illusions. We must look at the realities. Russia is in anarchy, Austria is in fragments, Germany is at present excluded, the United States of America, the author of the whole scheme, is happy to now decline to bind herself in any effective way. Well, after all is said and done, there is little left at present but England and France, with Italy and Japan and a cluster of smaller States or doubting neutrals. Certainly there is nothing sufficiently solid at the present time to justify us in laying aside those reasonable and moderate precautions of our Army, of our Air Force and, above all, the British Navy, which, whatever may happen elsewhere, will keep us safe and sound in our island home as they have kept us safe and sound before. It would be the greatest possible mistake for us to cast away those reasonable and prudent measures of defence to which we owe our present existence, and to put our trust instead in an International Council from which the most powerful nations of the world are absent and in which there will still be working, whatever they may say, all those national and racial ambitions and animosities which have already inflicted such immense injury upon mankind."

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MORAL: Consolidate our forces and armaments and see to it that not one day is unnecessarily lost in laying such a foundation to our Royal Air Force that it shall be a League of Peace in itself for the whole of the Civilised World.

▣ ▣

Aerodrome and Landing Grounds

THE Air Ministry announces that the following list of aerodromes is issued as an addition to the lists already published.

LIST D.—*List of aerodromes licensed as suitable for Avro 504 K and other similar types only. Except in a very few instances accommodation does not exist. The licences have also in the majority of cases been issued for limited periods only.*

Aerodrome.	Location of Aerodrome.	Nearest large town.
Portobello.	Craigentinny (south west of Marine Gardens)	Portobello.
Edinburgh.	Grove Road.	Edinburgh.

Signposts for Airmen

THE Air Ministry announces that the following Notice to Airmen (No. 4) has been issued:—

"In order to assist airmen to locate their position, names have been painted in large white letters on a black background, on the roofs of the undermentioned railway stations:—1. Hitchin (G.N.R.); 2. Redhill (S.E. & C.R.); 3. Tonbridge (S.E. & C.R.); 4. Ashford (S.E. & C.R.).

"The name Edenbridge has also been marked in large chalk letters on a plot of land adjacent to Edenbridge Station (S.E. & C.R.).

"Should future circumstances justify the marking of railway stations other than the above due notification will be given."

Captain Matthews at Constantinople

A DELAYED message from Constantinople states that Capt. Matthews, on the Sopwith "Wallaby," arrived there on December 23, from Belgrade. He intends to go on to Baghdad as soon as the weather permits.

Sir Ross-Smith's Flight

A REQUEST by the Commonwealth Government has led the Queensland authorities to place the whole of the resources of the State Railway workshops at Ipswich at Sir Ross-Smith's disposal for the repair of his aeroplane, which has now been sent by train from Charleville.

Aeroplanes for the Sudan

A DELAYED message from Cairo states that a squadron of aeroplanes has been sent to join the expedition against the Dinka tribe which attacked the advance guard of a punitive column and killed Maj. Stigand and Maj. White near Tombe in the Mongalla Province, in the Upper Nile region, in the early part of December.

The Victory Medal

IN connection with the Army Council Instruction just issued stating that a preliminary issue of the Victory Medal Riband will now be made officially to those entitled to the medal, it is pointed out that soldiers discharged from the R.F.C. before April 1, 1918, should apply to R.A.F. Record Office, Blandford, on special post-card F.S. Form 758, obtainable at any post-office.

The Douglas-Pennant Inquiry Report

THE Report from the Select Committee of the House of Lords on the Women's Royal Air Force: Inquiry on Miss Violet Douglas-Pennant, with two appendices, together with the proceedings of the Committee and minutes of evidence, was issued on Monday as a Blue Book. It contains 406 pages, and may be purchased for 4s. through any bookseller or direct from H.M. Stationery Offices.

FLIGHT

THE ROYAL AIR FORCE

London Gazette, December 19, 1919

Administrative Branch

Sec. Lieut. S. A. Hipple to be Lieut.; June 20.

Pilot-Officer H. Silvester to be Flying-Officer; Oct. 1.

The following relinquish their temp. R.A.F. commns. on return to Army Duty:—Wing-Com. D. Powell, C.B.E. (Maj. Bt.-Lieut.-Col.) (R. Welsh Fus.); Aug. 19. Sec. Lieut. (Hon. Lieut.) H. Cooper, M.C. (Lieut. (temp. Capt.), R. Fus.); Oct. 20. (substituted for notification in *Gazette* of Nov. 4). Sqdn.-Ldr. P. Owen (Maj., R. Marines) relinquishes his temp. R.A.F. commn. on return to Royal Marines; Dec. 15.

(Then follow the names of 28 officers who are transfd. to the Unemployed List under various dates.)

Lieut. A. D Whitehead (R. War R.) relinquishes his commn. on account of ill-health caused by wounds; Dec. 11.

The initials of Lieut. J. V. L. Hall are as now described, and not "T." V. L., as stated in *Gazette*, Oct. 15, 1918.

The initials of Flight-Lieut. E. St. C. Harnett, O.B.E., are as now described and not E. St. Harnett, as stated in *Gazette*, Dec. 16.

The notification in *Gazette*, Feb. 21, concerning Lieut. (actg. Capt.) S. Ransom is cancelled.

Technical Branch

Flying-Officer W. J. Standish is graded for purposes of pay and allowances as Flight-Lieut. whilst employed as Flight-Lieut., Grade (A.), from Aug. 8 to Sept. 11. (Substituted for notification in *Gazette*, Oct. 17.)

(Then follow the names of 21 officers who are transfd. to the Unemployed List under various dates.)

The notification in *Gazette* of Feb. 18, concerning Lieut. W. J. Walford, is cancelled (notification in *Gazette* of March 28 to stand).

The notification in *Gazette* of Nov. 21, concerning Lieut. E. F. L. Taylor, is cancelled (notification in *Gazette* of Oct. 14 to stand).

Medical Branch

(Two officers transfd. to the Unemployed List.)

The initials of Flight-Lieut. W. F. Sheil are as now described, and not W. "E." as stated in *Gazette* of Dec. 9.

Memoranda

Sec. Lieut. D. B. Gunn to be Lieut.; July 16.

Capt. C. W. Wise, O.B.E., M.C. (Capt., R.A.S.C., S.R.) relinquishes his commn. on ceasing to be employed; May 6.

The following temp. hon. Lieuts. relinquish their commns. on ceasing to be employed:—T. B. Ringwood; Mar. 25. A. H. Simmonds; Sept. 16. W. Williamson; Oct. 16.

(Five officers transfd. to the Unemployed List.)

The notification in the *Gazette* of Nov. 28 concerning temp. hon. Lieut. L. J. Hill is cancelled.

London Gazette, December 30, 1919

The following temp. appointments are made:—

Staff Officer, 2nd Class.—(T.).—Flight-Lieut. F. J. Linnell; Nov. 6.

Staff Officer, 3rd Class.—(O.).—Flying Officer (Hon. Flight.-Lieut.) A. J. Barber; Oct. 28.

The notification in *Gazette* of Dec. 16, concerning Lieut. V. Stranders is substituted for notifications in *Gazettes* of Aug. 6, 1918, Oct. 4, 1918, and Nov. 29, 1918, and not as stated in *Gazette*, Dec. 16.

Flying Branch.

Sec. Lieuts. to be Lieuts.—(Hon. Capt.) H. E. Turnley; May 20, 1918. P. Stewart-Burton; June 21.

J.Pilot Officers to be Flying Officers.—S. T. Goodnoh; Aug. 24. J. P. Skedlant; Sept. 10.

P.F.O. G. Knight (late R.N.A.S.) is granted a temp. commn. as Sec. Lieut. (A.); Aug. 14, 1918.

The following relinquish their temp. R.A.F. commns. on return to Army duty:—Flying Officer S. A. Harrison (Lieut., R.A.S.C.); April 5, 1918. Pilot Officer J. A. Massey (Sec. Lieut., Essex R.); Jan. 4. Pilot Officer E. J. Price (Sec. Lieut., N. Lanc. R.); July 25). Pilot Officer F. Hill (Lieut., Durh. L.I.); July 31. Flying Officer F. H. Jebens (Lieut., S. Lanc. R.); Sept. 2. Flying Officer J. S. Millar (Lieut., Scot. Rif.); No. 5. Flying Officer H. E. Haslehurst (Capt., L'pool R.); Nov. 8. Flying Officer F. R. Offord (Lieut., R. Mun. Fus.); Nov. 12. Flying Officer R. H. Wathes (Lieut., Notts. and Derby R.); Nov. 19. Flying Officer A. G. Batterham (Lieut., R. W. Surr. R.); Nov. 24. Flying Officer J. R. I. Scambler (Lieut., R.F.A.); Dec. 7. Flying Officer A. Belle (Lieut., Leic. R.); Dec. 9. Pilot Officer (Hon. Flying Officer) J. S. Arthur, M.C. (Lieut., R.F.A.); Dec. 11. Flying Officer E. J. Cronin (Lieut., Nova Scotia R.); Flying Officer E. J. Fulton (Capt., Ind. Army); Dec. 16. Pilot Officer E. P. Moxey (Lieut., S. Wales Bord.); Dec. 18. Sqdn. Leader D. Rainsford-Hanney, O.B.E. (Capt., 53rd Sikhs); Dec. 24. Flying Officer N. Greenslade, M.C. (Lieut., Devon R.); Dec. 29.

(Then follow the names of 88 officers who are transfd. to the Unemployed List under various dates.)

Capt. (actg. Maj.) E. Henty relinquishes his commn. on account of ill-health, and is permitted to retain the rank of Maj.; Dec. 27. (Substituted for notification in *Gazette* of Jan. 7.)

Capt. S. E. Adams relinquishes his commn. on account of ill-health contracted on active service, and is granted the rank of Maj.; Dec. 4. (Substituted for notification in *Gazette* of Dec. 12.)

The following Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—F. M. Ohrt (contracted on active service); Dec. 2. J. G. H. Frew (caused by wounds); Dec. 17.

Lieut. V. Westerby, M.M. (Lieut., R. H. and R.F.A.), relinquishes his temp. R.A.F. commn. on retirement from Army; Dec. 20.

The following Sec. Lieuts. relinquish their commns. on account of ill-health, and are permitted to retain their rank:—V. M. Mitchell (contracted on active service); Dec. 7. (Substituted for notification in *Gazette* of Nov. 18.) G. G. H. Du Bowlay (contracted on active service), W. I. Crawford (caused by wounds), C. W. Manson (contracted on active service; Dec. 18. B. Hickman (caused by wounds); Dec. 22.

The surname of Sec. Lieut. (Hon. Lieut.) R. S. Blucke is as now described, and not as stated in *Gazette* of April 15.

The surname of Capt. R. J. Paul is as now described, and not Paull as stated in *Gazette* of April 4.

The notification in *Gazette* of July 4 concerning Lieut. I. C. G. Simpson is cancelled. (Notification in *Gazette* of Aug. 22 to stand.)

The notification in *Gazette* of July 22 concerning Lieut. R. M. Roberts is cancelled. (Notification in *Gazette* of May 13 to stand.)

The notification in *Gazette* of Aug. 8 concerning Sec. Lieut. Cecil Stubbs is cancelled.

The notification in *Gazette* of Aug. 22 concerning Sec. Lieut. W. J. Spicer is cancelled.

The notification in *Gazette* of Sept. 19 concerning Sec. Lieut. T. Sydenham is cancelled.

The notification in *Gazette* of Nov. 18 concerning Lieut. D. E. P. Chaplin is cancelled. (Notification in *Gazette* of Oct. 31 to stand.)

Administrative Branch

Sec. Lieuts. to be Lieuts.—W. M. Everett; Feb. 16. J. J. McBrearty; March 1. E. H. B. C. Linton; April 19.

The following relinquish their temp. R.A.F. commns. on return to Army duty:—Sqdn. Leader A. B. Winch, D.S.O. (Lieut.-Col., 2nd Dgns. Res.); May 4. Flight Lieut. W. T. F. Holland (Lieut., 21st Lrs.); June 5 (substituted for notification in *Gazette*, Nov. 11). Flight Lieut. A. Howe (Capt., R.W. Kent R.); Oct. 4 (substituted for notification in *Gazette*, Oct. 21). Flight Lieut. F. E. Breacher (T./Capt., Leic. R.); Dec. 18.

(Then follow the names of 15 officers who are transfd. to the Unemployed List under various dates.)

Lieut. R. T. Jones, D.F.C., relinquishes his commn. on account of ill-health caused by wounds, and is granted the rank of Capt.; Nov. 5 (substituted for notification in *Gazette*, Nov. 11).

Lieut. H. A. Jones, M.C., relinquishes his commn. on account of ill-health caused by wounds, and is permitted to retain his rank; Dec. 23.

Lieut. W. W. Glenn, M.C. (Lieut., R.H. and R.F.A.) relinquishes his temp. R.A.F. commn. on retirement from the Army; Dec. 20.

Sec. Lieut. (Hon. Lieut.) R. Gwynne-Norton relinquishes his commn. on account of ill-health contracted on active service, and is permitted to retain his rank; Dec. 23.

Sec. Lieut. R. M. Colvill relinquishes his commn. on account of ill-health, and is permitted to retain his rank; Dec. 23.

Technical Branch

Sec. Lieut. T. J. Fazackerley to be Lieut., without pay and allowances of that rank; April 23, 1918.

The following Flying Officers relinquish their temp. R.A.F. commns. on return to Army duty:—J. W. Lawlor; Oct. 10. W. Maidstone (Lieut., R. Ir. Fus.); Dec. 8.

(Then follow the names of 20 officers who are transfd. to the Unemployed List under various dates.)

Lieut. E. G. Webber (Sec. Lieut., Extra Reg. Empld. List) resigns his commn.; Dec. 31.

The surname of Capt. F. A. Applebee is as now described, and not as stated in *Gazette*, April 8.

The notification in *Gazette*, Nov. 28 concerning Capt. P. E. Gwyer, M.B.E. is cancelled.

The notification in *Gazette*, Oct. 17, concerning Lieut. A. L. C. Fuller is cancelled; notification in *Gazette*, Sept. 26, to stand.

The notification in *Gazette*, Sept. 2, concerning Sec. Lieut. (Hon. Lieut.) P. Rourke is cancelled.

Medical Branch

Maj. E. C. Clements (R.A.M.C., T.F.) is granted a temp. commn. as Maj. on seconding to R.A.F.; July 13, 1918.

(One officer transfd. to Unemployed List.)

Memoranda

The following relinquish their temp. R.A.F. commns. on return to Army duty:—Flying Officer C. E. J. Trafford, M.C. (Capt., Scots Gds.); Feb. 2. Group Capt. A. M. Bent, C.M.G., C.B.E. (Col. Active List); Dec. 18.

(One officer transfd. to the Unemployed List.)

Wing Comdr. M. G. Christie, C.M.G., D.S.O., M.C., is placed on the half-pay list; Dec. 20 (substituted for notification in *Gazette*, Dec. 2).

Sec. Lieut. R. F. F. Anderson relinquishes his commn. and is permitted to retain his rank; July 12.

London Gazette, January 2

Flying Branch

Capt. A. H. Wann is graded for purposes of pay and allowances as Maj. whilst employed at Maj. (Airship), from May 1, 1919, to July 31, 1919.

Lieut. (actg. Capt.) T. A. Warne-Browne, D.S.C., retains actg. rank of Capt. whilst employed as Capt. (A.), from Oct. 28, 1918, to April 30, 1919.

Lieuts, to be actg. Capts. whilst employed at Capts.:—J. H. Green (S.), from Oct. 26, 1918, to April 30, 1919; W. G. Ryan (A.), from Nov. 29, 1918, to Feb. 24, 1919; C. J. W. Hatcher, A.F.C. (Airship), from March 18, 1919, to April 30, 1919; N. G. Fraser, A.F.C. (A. and S.), from July 22, 1919, to Oct. 10, 1919.

The following Lieuts. are graded for purposes of pay and allowances as Capts. whilst employed as Capts.:—C. J. W. Hatcher, A.F.C. (Airship); May 1, 1919. J. S. Stubbs, D.F.C., A.F.C. (A.), from May 1, 1919, to July 31, 1919.

Flying Officer F. Keith to be Flying Officer (A.), from (O.); Dec. 13, 1919.

Flying Officer J. B. Seward (I.A.R.O.) relinquishes his temp. R.A.F. commn. on reverting to (I.A.R.O.); Oct. 6, 1918.

Wing-Comdr. F. L. M. Boothby (Comdr., R.N.) relinquishes his temp. R.A.F. commn. on return to Naval duty; Dec. 20, 1919.

Lieut. E. McN. Hand, D.F.C., relinquishes his commn. on ceasing to be employed, and is granted the rank of Capt.; Sept. 28, 1919.

(Then follow the names of 19 officers who are transfd. to the Unemployed List under various dates.)

Capt. L. M. Mansbridge (Lieut., Dorset R.) resigns his commn. and is permitted to retain his rank of Capt.; Jan. 3, 1920.

Sec. Lieut. A. V. Redwood is antedated in his appointment as Sec. Lieut. (A.); June 16, 1918.

The notification in *Gazette* Dec. 5, 1919, concerning Lieut. H. E. Hyde is cancelled.

The notification in *Gazette* Nov. 28, 1919, concerning Sec. Lieut. S. H. Potter is cancelled.

Administrative Branch.

Sqdn. Ldr. H. Ellershaw relinquishes the grading for pay and allowances as S.O. 2 (1st Grade); Dec. 27, 1919.

Flt.-Lieut. E. W. Simpson to be Flt.-Lieut. from (S.O.); Nov. 11, 1919.

Sec. Lieut. E. Bentley is graded for purposes of pay and allowances as Capt. while employed as Capt., from May 1, 1919, to Aug. 8, 1919.

Flying Officer (actg. Flt.-Lieut.) F. Edwards relinquishes his actg. rank of Flt.-Lieut. on ceasing to be employed as Flt.-Lieut., from (S.O.); Dec. 11, 1919.

Flying Officer L. C. Boyd to be Flying Officer, from (A.); Nov. 8, 1919.

Sec. Lieut. C. Stelfox (late Gen. List, R.F.C.) (on prob.) is confirmed in rank as Sec. Lieut.; Aug. 1, 1918.

The following relinquish their temp. R.A.F. commns. on return to Army duty:—Pilot Officer W. A. Renshaw (Sec. Lieut., North'd. Fus.); Jan. 15 1919. Sqdn. Ldr. S. H. Cleall (Qrmr. and Capt., R. Irish Fus.); Dec. 15

1919. Flying Officer J. Abbott (Lieut., actg. Capt.), Leic. R.); Dec 20, 1919.

(Then follow the names of 5 officers who are transfd. to the Unemployed List under various dates.)

Technical Branch.

Sqdn. Ldr. C. Barber is graded for purposes of pay and allowances as Wing Comdr. whilst employed as Wing Comdr., Grade B; Oct. 18, 1919.

Sec. Lieut. W. Dentith is graded for purposes of pay and allowances as Capt. whilst employed as Capt., Grade A, from May 1, 1919, to Oct. 8, 1919 substituted for notification in *Gazette* of Oct. 21, 1919).

2 officers transfd. to Unemployed List.

The notification in *Gazette* of June 4, 1918, concerning C. H. Welsh is cancelled.

Memoranda.

Then follow the names of 3 Cadets who are granted hon. commns. as Sec. Lieuts.

The following Probationary Flight Officer is granted an hon. commn. as Sec. Lieut.:—F. J. Forty; Feb. 26, 1919.

The initials of 171820 Cadet W. J. Blais are as now described, and not as stated in *Gazette* of May 6, 1919.

Roll of Honour

The War Office announced on December 3 that Capt. R. G. H. PIXLEY, R.F.A., attached R.F.C., previously reported missing, is now reported killed.

Deaths

The War Office announced on December 29 that Sec. Lieut. L. O. HAREL, R.F.C., and Lieut. S. R. PINDER, R.F.C., previously reported missing, are now reported killed.

Capt. MICHAEL HENRY TISDALL, R.A.F., who was accidentally killed at Quetta on December 23, was the eldest son of Rev. A. O. Tisdall, Vicar of Hartley Wintney, and the late Evelyn Susan Tisdall.

Married

Capt. J. ALEXANDER MACNAB, R.A.F., only son of the late J. A. Macnab and Mrs. Macnab, of Harrogate, was married on December 12 at St. Margaret's, Westminster, to IRENE MARGUERITE CAMPBELL, only daughter of Comdr. C. A. RADCLIFFE, R.N., and Mrs. Radcliffe.

Capt. GERALD S. MARSHALL, O.B.E., R.A.F. (Med.), was married on December 23 at St. Mary's, Beddington, Surrey, to KATHLEEN MITCHELL, late Deputy Administrator, W.R.A.F.

To be Married

The marriage between Major H. A. R. AUBREY, O.B.E., M.C., the King's Shropshire Light Infantry, attached R.A.F., son of Dr. and Mrs. John Aubrey, of Cowes, and ADA MARIAN, only daughter of the late THOMAS HOUGHTON and MRS. HOUGHTON, of Helston, Purley, Surrey, will take place at St. Patrick's Church, Hove, on January 15, at 12.15 p.m.

The engagement is announced between JACK DUTSON (late Capt., R.A.F.), only son of Mr. and Mrs. William Dutson of Bristol, and DOROTHY, younger daughter of Mr. and Mrs R. J. HUDLESTON, of Portishead.

◈ ◈

The engagement is announced between Lieut. D. BRODIE JAMES (late R.A.F.), younger and only surviving son of Mr. and Mrs. A. F. Brodie James, of Kensington, W., and Miss MARGARET SADDINGTON, only daughter of Mr. and Mrs. H. Saddington, 15, Brunswick Square, Hove.

A marriage has been arranged, and will shortly take place, between Mr. FORDE LEATHLEY, M.C., R.A.F., son of the Rev. J. Forde Leathley, Rooske, Dunboyne, Meath, and IDA, daughter of the late Mr. GEORGE EDWARD FOSTER and Mrs. Foster, of 7, Bickenhall Mansions, W.

The engagement is announced between Capt. THOMAS MALCOLM DICKINSON, D.F.C., 16th Cavalry Indian Army and R.A.F., younger son of the late Capt. T. M. Dickinson Royal Artillery and Mrs. Paget-Davies, of 25, Brunswick Terrace, Hove, and ELSIE, the daughter of Col. C. H. GARDINER, late Suffolk Regiment, and Mrs. Gardiner, of 62, Brunswick Place, Hove.

The engagement is announced between Lieut. H. F. O. FARRELL, late R.F.C. and R.A.F., Ont., Canada, and ETHEL ANNIE, only daughter of Mrs. E. NAYLOR, "Crowestones," Buxton, Derbyshire. The marriage will take place shortly at St. Andrew's Cathedral, Singapore.

The engagement is announced between RICHARD C. QUINEY, only son of Mr. and Mrs. Alfred Quiney, of Teddington, to DOLLY, widow of Lieut. E. John Bice, M.C., A.F.C., and youngest daughter of Mrs. ALBERT BARDER, of 7, Garlinge Road, Brondesbury, N.W.2.

The engagement is announced between Capt. ALEXANDER CECIL RANKIN, M.C., D.F.C., only son of Mr. and Mrs. J. Naismith Rankin, of 40, Ashton Gardens, Glasgow, West, and RHODA GILLATT, only daughter of Mr. and Mrs. STANLEY BROWN, of Bryan House, The Mount, Hampstead.

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The R.Ae.S. Library

MEMBERS of the Royal Aeronautical Society should note that the library at the Society's headquarters, 7, Albemarle Street, W., is now open on Saturday afternoon, during the hours from 2 to 5.

Recent Developments in Aviation.

IN connection with the series of L.C.C. lectures for teachers on "Recent Developments in Science," Lord Montagu of Beaulieu will give a lecture on Aviation on January 13, at 6 p.m., at King's College, Strand, W.C. 2. The chairman will be Maj.-Gen. Sir F. H. Sykes, G.B.E., K.C.B., C.M.G.

Aircraft Photography in War and Peace

THIS is to be the subject of three Cantor Lectures to be given before the Royal Society of Arts, John Street, Adelphi, by Capt. H. Hamshaw Thomas, M.B.E., M.A., F.R.S., formerly of the R.A.F. The lectures will be given at 8 p.m. on January 19, 26, and February 2.

The H.P. Continental Services

DURING 1919, the first year of British commercial aviation, Handley Page passenger and freight carrying aeroplanes have carried 4,006 passengers, 43,267 lb. of freight over a distance of 69,943 miles. This was accomplished between May 1, 1919, and December 31, 1919.

On the London-Paris service between September 2 and January 1, 1920, 618 passengers and 16,982 lb. of freight have been carried, the total distance covered being 34,600 miles. On the London-Brussels Air Service from September 26 until January 1, 1920, 251 passengers and 25,863 lb. of freight and mails have been carried over a total distance of 25,893 miles.

New Machines for H.P. Services

IN the coming year the London, Paris and Brussels air services will be developed considerably; new air routes will be opened and mail, passenger and freight carrying contracts which have been secured abroad will commence operations in the spring. The converted Handley Page bombing machines, which have been carrying out the Continental air services, are to be replaced by the new model Handley Page commercial aeroplane, W.8, which carries 15 passengers or 2 tons of cargo at a speed of 112 m.p.h. Every endeavour will be made in the coming year to keep pace, both at home and abroad, with the State subsidised commercial aviation activities of France, Italy, America, Germany, and other countries.

New Professor of Metallurgy, Sheffield

DR. CECIL H. DESCH, Professor of Metallurgy at the Royal Technical College, Glasgow, has been appointed to a similar post at Sheffield University in succession to Dr. Arnold, who recently resigned, and has been elected Emeritus Professor.

FLIGHT
The AIRCRAFT ENGINEER AIRSHIPS

CORRESPONDENCE

[The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.]

PROFESSOR ARNOLD'S NEW HIGH-SPEED STEEL

[1987] The claim put forward by Dr. Arnold of having discovered a new high-speed steel in which no tungsten is used and the resulting discussion in the press has created widespread interest in metallurgical and engineering circles. As we have been manufacturing tungstenless molybdenum high-speed steels for some considerable time, and have given very great attention to the theory and practice of alloy steels generally, perhaps you will permit us to give the public some important facts relating to the matter which have not been brought to light.

We may say at the outset that we fully endorse Dr. Arnold's view that molybdenum in high-speed steel produces far better results than tungsten. We must, however, dispute his claim that his formula is new, and also that vanadium has proved an efficient stabiliser of molybdenum when used with it. As a matter of fact, not long after the introduction of tungsten high-speed steel molybdenum high-speed steel both with and without vanadium was made in the United Kingdom, France, Germany, Luxembourg, Austria and the United States, similar to the formula which Dr. Arnold has now made public. The occasional startling results of such molybdenum mixtures, superior to the very best tungsten high-speed steel, induced many firms to plunge into schemes for producing molybdenum steels on an extensive scale, but all had to be abandoned because the resulting product lacked uniformity. Much of it was of excellent quality, but on the other hand batches of tools failed entirely when subjected to workshop tests, although they showed the correct analysis. In the cases where vanadium was added it failed to be uniform in bulk manufacture, just the same as the molybdenum steel without vanadium, consequently the makers fell back upon tungsten.

We attribute Dr. Arnold's erroneous faith in vanadium as a stabiliser to molybdenum steel to the circumstance that he experimented merely on small quantities. However, only bulk production can disclose the presence or otherwise of a real stabilising element.

Mr. P. R. Kuehnrich, of Sheffield, who has the reputation of having carried out more tool-steel alloying experiments than any living man, made the discovery that cobalt acted as a definite stabiliser to molybdenum, and he patented a formula to this effect.

As the licensees under that patent, we have made and distributed hundreds of tons of the Como brand molybdenum super high-speed steel, and completely proved that cobalt is *de facto* a stabiliser.

"Como" steel is now largely used in many parts of the world, and is thoroughly justifying the warranty advertised in the technical press guaranteeing it to produce superior results to tungsten high-speed steel.

The molybdenum high-speed steel is more costly to produce than tungsten steel. Users, however, are only too willing to pay the higher price, as the greater service the material renders makes it intrinsically the cheaper material.

DARWIN AND MILNER, LTD.,
SYBRY SEARLS AND CO., LTD.,
SPARTAN STEEL CO., LTD.,
Manufacturers, Licensees and Distributors of Como (Molybdenum Super High-Speed Steel).

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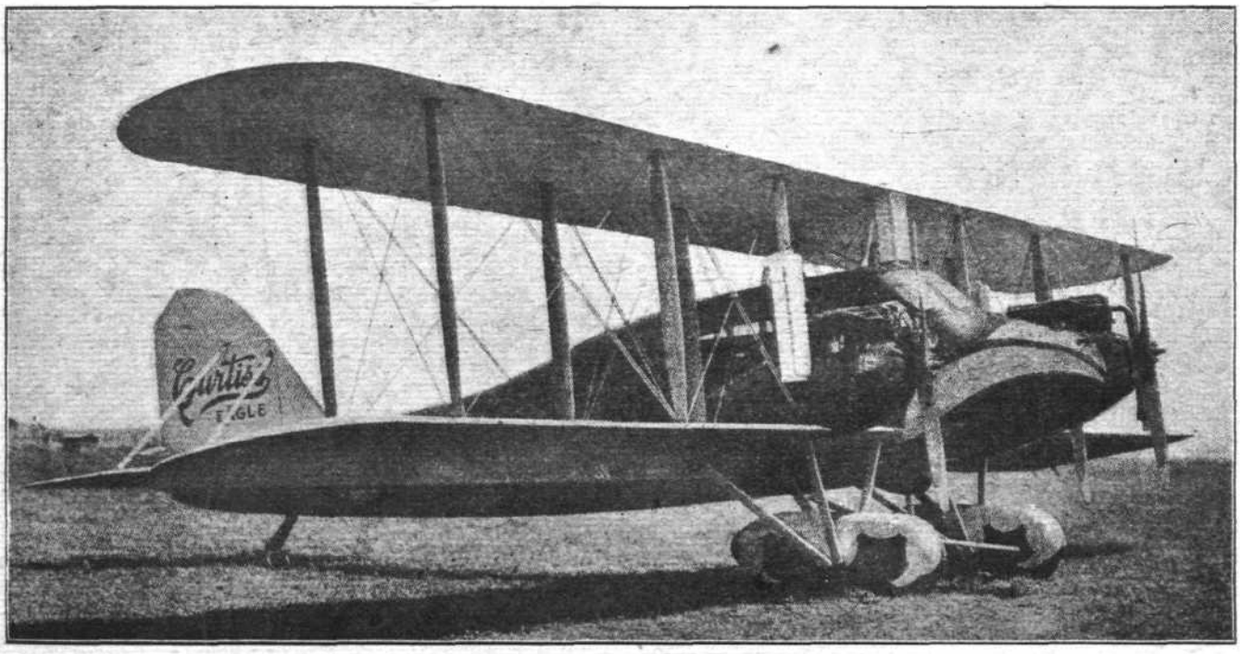
THE CURTISS "EAGLE"

THE following brief particulars are to hand of the Curtiss "Eagle" eight-seater aerial limousine, which was recently put through its first public demonstration by Roland Rohlfs, at Roosevelt Field, L.I., U.S.A. Six passengers were taken up on each trip, and on one occasion an altitude of 20,000 ft. was attained.

The "Eagle" is intended for passenger or cargo work, and is a *fuselage* biplane fitted with three 150 h.p. Curtiss K-6 engines. One of these engines is placed in the nose of the *fuselage* and drives a tractor screw, whilst the other two engines are disposed one on each side of the *fuselage*, in a streamlined *nacelle*, and also drive tractor screws. Aft of the central engine the *fuselage* is formed into a cabin, which is luxuriously fitted up. There are eight upholstered wicker chairs, arranged in two rows with a wide aisle in between, the two front seats being for the pilots. In the front of the cabin, and at the sides at each seat, are large Triplex windows. At the rear is a compartment for luggage. If used as a cargo machine, a useful load of one ton can be carried. The engines are provided with electric starters, and dual control of the Deperdussin type is provided.

The overall span of the "Eagle" is 61 ft. 4 ins., chord 6 ft. 9 ins., and wing area 770 sq. ft. The gross weight of the machine is 7,450 lbs. It has a speed range of 54-107 m.p.h., and climbs to 4,000 ft. in ten minutes. At full power the range is 350 miles, or at cruising speed 475 miles. The machine will fly on any two motors, and with light load, on one engine.



The Curtiss "Eagle"—in full make-up—which is fitted with three 150 h.p. Curtiss K-6 engines, one in the nose, or "beak," of the *fuselage*, and one, in a *nacelle*, on each side of the *fuselage*.

FOREIGN AVIATION NEWS

The Deutsch Cup Contest

ON January 4 Sadi-Lecointe, on his Nieuport-Hispano, succeeded in beating his own previous record on a Spad for the Deutsch Cup. He covered the 190 kilom. circuit round Paris in 42 min. 53⅘ secs., equal to 266·314 kiloms. per hour (165 miles an hour).

French Atlantic Flight Scheme

ARRANGEMENTS are being made for a French machine to attempt a flight over the Atlantic from Dakar to Pernambuco, probably in April or May. The distance is about 1,900 miles, but it is proposed to use a machine with a radius of 3,000 miles.

Paris-Saigon Flight to be Attempted.

FOR several weeks past the French pilots Drouilh and Desnozelles have been experimenting with a two-engined (300 h.p. Hispano Suiza) Nieuport-Tellier seaplane with a view to flying from Paris to Saigon, Indo-China. For this trip of over 9,000 miles the route will be over St. Raphael, Naples, Athens, Antioch, Basra, Bander Abbas, Karachi, Allahabad, Chittagong, Rangoon and Bangkok, and it is proposed to divide it into 13 stages of roughly 1,000 kiloms. each. The enterprise is being subsidised by the Association of Exporters of Rice in Indo-China and the machine has been christened "Pourquoi-Pas."

A New Looping Record

WE have had what may be called the looping duration record, and now a Frenchman has set up a looping speed record. On Sunday week M. Pillon is stated to have looped 29 times in 5 mins. at a height of between 300 and 350 metres on a Farman sporting type machine.

The French Aviation Regiments

IT has now been decided that the seven observation regiments in the French service shall be distributed as follows:—1, Tours; 2, Longvic (Dijon); 3, Beauvais; 4, Le Bourget; 5, Lyon-Bron; 6, Toul; 7, Pau. Of the three bombarding regiments one will be stationed at Metz, one at Malzeville-Luxeuil, and the third at Avord. The three chasing regiments will be quartered at Thionville, Strasbourg and Chateauroux respectively.

The two colonial regiments, one for Morocco and one for Algeria, and Tunisia will each be complete in themselves, comprising observation, chasing and bombarding sections. The stations in Morocco will be at Rabat and Casablanca, in Algeria at Hussein-Dey, and in Tunisia at Tunis.

A Lady's Flight to Morocco

A FRENCH bride arrived at Rabat, Morocco, on December 19, having travelled as a passenger on a 300 h.p. Breguet, piloted by her husband, Lieut. Daurat, from Toulouse. The distance is roughly 1,150 miles, and the route followed was *via* Barcelona, Valencia, Alicante, Granada, Malaga and Tangier. She claims to be the first woman to fly from France to Morocco.

Prince Loops the Loop

DURING his recent visit to France, Prince Eric of Denmark, with two Danish officers, went out to the Villacoublay Aerodrome and saw the aviator Fronval give a display on his Farman machine. Later Prince Eric ascended with Fronval and looped the loop several times.

Aviation at the Fêtes de Paris

IN connection with the Fêtes de Paris it is proposed to hold competitions for aeroplanes at Juvisy on May 22 and 23. The classes include those for single-seaters, two-seaters and multi-seaters fitted with one or more engines, and only French-built machines will be eligible, while pilots must have taken the French military brevet.

Seaplane Contests at Antwerp

ARRANGEMENTS are being made to hold competitions for seaplanes at Antwerp during the second fortnight in July. There will be two main divisions: with tests for speed and weight-lifting, and other points which will be observed will be endurance, security and flotation. There will also be two contests for machines specially designed for colonial use, and the winners, besides receiving cups, will be purchased.

D'Annunzio's Rome-Tokyo Flight

IF the Fiume business is settled d'Annunzio proposes to start on his expedition from Rome to Tokyo about January 15. Three machines will be used—two three-seaters and one two-seater—the former carrying two pilots and two mechanics, and the other two pilots. The pilots engaged are Lieuts. Garrone, Abba, Ronalumi, Negrini and Scavini.

Germany's Aerial Losses

FIGURES which have recently been published in Germany go to show that the total losses in the German air service during the War totalled 2,483 dead and 3,327 injured. These figures are made up as follows:—

	At the Front.				In Germany.	
	Dead.		Injured.			
	Accidents.	Fights	Accidents.	Fights.	Dead.	Injured
Pilots	783	426	1,020	652	430	39
Observers ..	176	305	312	425	49	32
Mechanics ..	96	19	138	13	40	51

In addition 159 student-pilots were killed and 247 injured in Germany during the War period.

Germany's Aerial Force

ON the occasion of a recent commemoration in honour of Capt. Boelke, organised by the Aero Club of Berlin, some interesting figures were published which illustrate the growth of Germany's Air Service during the War. The figures are as follows:—

	Aug., 1914.	Nov., 1918.
Machines (fighting, bombing, scouting)	246	4,050
Escadrilles for defending the interior	18	108
Pilots at the front	500	5,000
Personnel in the interior	500	80,000
Monthly consumption of spirit, litres	600,000	7,000,000
Machines fitted with cameras ..	100	2,000

Zeppelin Activity

A NEW biplane, capable of carrying 50 passengers, is being turned out by the Zeppelin works. The machine, which is of 52 m. span, is equipped with four 260 h.p. motors. It is said that it has a speed of between 100 and 110 m.p.h., and a radius of action of 2,200 miles.

The Zeppelin works at Friedrichshafen and Spandau are now busy on new dirigables, larger than the "Bodensee."

A Fokker Giant

M. FOKKER continues to keep himself in the limelight. It is now stated that he has drafted the plans of, and will shortly begin building, a large passenger aeroplane capable of carrying 60 passengers. The machine, intended for long overland flights, will have six motors, which it is hoped will give it a speed of 75 miles an hour. Sleeping berths and a smoking-room are to be constructed under the planes.

Aircraft Construction in Norway

A PROPOSAL has been made by the Norwegian Aircraft Commission that concessions for aircraft within Norwegian frontiers should be only granted to Norwegian companies, with certain reciprocal exceptions.

A Swedish Appointment

DR. MALMER, the Director of the Thulin aeroplane works at Landskrona, has been appointed Lecturer in Technical Aviation at the Stockholm Technical Academy.

Peruvian Coastal Service

UNDER the auspices of the Peruvian Corporation, Handley Page will inaugurate a coastal hydroplane service, reports *The Times* correspondent at Lima. One pilot and three mechanics arrived in the *Ortega*, and two hydroplanes and the second pilot are expected in a fortnight.

The first service will be established between Callao, the summer resort of Ancon, and Port Salaverry.

Air Services in Argentina

A REGULAR air service has been inaugurated between Buenos Aires and Montevideo by members of the French Aviation Mission which has been in Argentina for some time with the object of organising such services in various parts of the country.

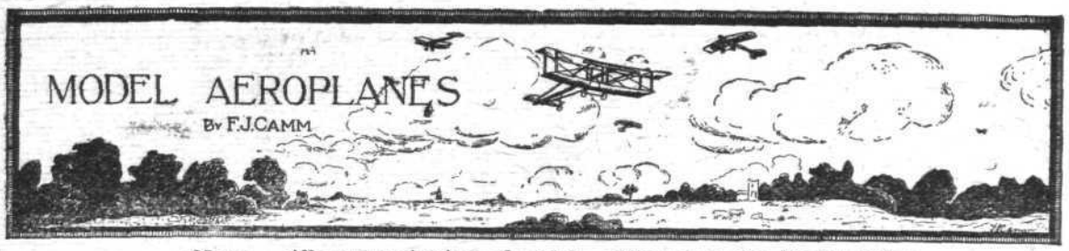
U.S. Aeroplanes in Peru

Two Curtiss aeroplanes of 90 h.p. are now flying here, reports *The Times* correspondent at Lima. Three more Curtiss planes have been shipped from New York, and the Curtiss firm is planning to enter the Peruvian aviation field on an extensive scale and to acquire its own aerodrome.

The Vickers Chinese Contract

THE contract for aeroplanes secured by the Vickers Co. from the Chinese Government appears to have caused a fluttering in the dovecotes in the United States. At any rate, a message from Peking makes it appear that the American Legation has protested to the Chinese Foreign Office against the Vickers contract on the ground that 10 years' preference on the supply of similar aeroplanes is opposed to equal opportunity for other countries.

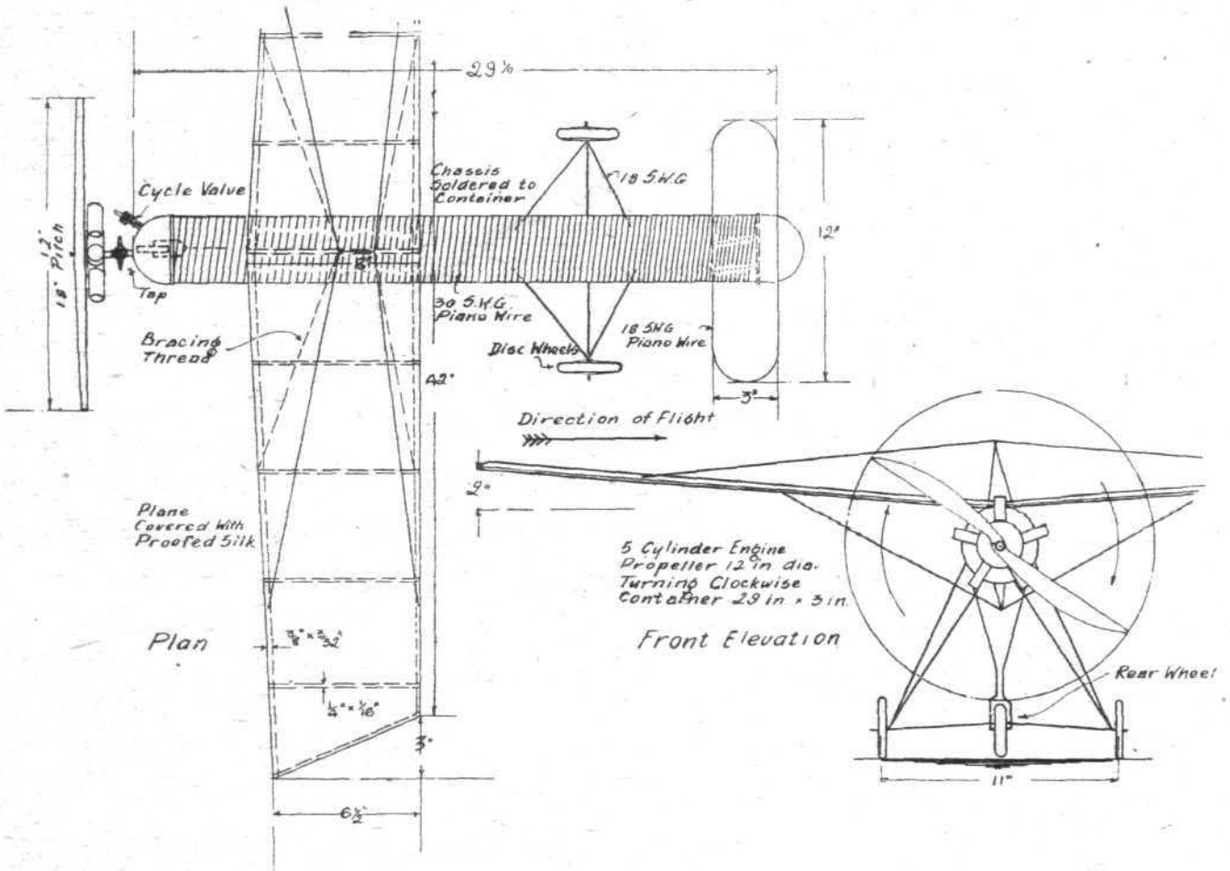
FLIGHT
AIRCRAFT ENGINEERING AND AIRSHIPS



NOTE.—*All communications should be addressed to the Model Editor.*

Compressed-air-driven Model

I SHOW this week a plan and end elevation of the model dealt with in the issue of Dec. 18. Birch was used for the mainplane (single-surfaced). The container is bound with 35 S.W.G. and weighs 4 oz.; the engine weighs 1½ oz. The planes are attached as shown in Fig. 4, by means of tinfoil straps fastened round the container body by means of draw bolts.



Histories of Model Clubs

The writer, just after the outbreak of War, in these columns raised the question of the histories of the older Model Aero Clubs. Space limitations and the absorption by the army of the members of those clubs, prevented the tentative project from reaching fruition, although the writer went to considerable trouble in retrospection of the history of the Windsor Aero and Gliding Club, with which he was formerly connected. The time, however, is now ripe for the publication of these histories, many of which were started. Evans, of the Paddington Club, promised one of his club, and so did many others. We should be glad, therefore, to receive them, or if secretaries will provide me with the data, I should be glad to write them myself for publication herein. Such matter should provide highly interesting reading, and I hope secretaries will communicate with me on the subject. Drawings need only be sent in rough outline (needless to add, with full dimensions and particulars), and I shall have great pleasure in preparing them for reproduction. Photographs must be sharp for reproduction.

Sheffield Aero Club (Affiliated with K. and M.A.A.).

WE have received the following from Mr. Cudworth:—"The above Club was founded on February 8, 1911. Owing to hostilities and most of the members joining the Army, the activities of the club have been in abeyance for the last four years. All interested in aeronautics desirous of becoming members (as the club is starting again early in the New Year), should communicate with the Hon. Secretary, Mr. C. F. W. Cudworth, 41, Coniston Road, Abbeydale, Sheffield; or the Vice-President, Mr. H. Slack, 70, Hawksley Avenue, Hillsborough, Sheffield.

British Records

We have received the following letter from Mr. Louch:—"I wish to point out a slight error made in the issue of FLIGHT for December 4, 1919. The error in question is with reference to official records. It is stated that the official duration record of 2 min. 49 sec. was created by Mr. L. H. Slatter, whereas that particular record was made by me. The records held by Mr. Slatter are twin-screw, R.O.G., distance 365 yards, and single screw hydro, off water, 35 secs.

"It may be of interest to know that the actual model, when flown a couple of weeks after creating the record of 2 min. 49 sec., attained a duration of 5 min. 5 sec., and over one mile distance, before 300 witnesses at Leytonstone (unofficially). Of course this was a so-called 'fluke,' the natural duration of the machine being as shown by the 'record.' It is interesting to note that my machine in three consecutive flights created the same performance as given in the first article. There was no glide, the air was damp and conditions generally unfavourable."

Replies to Correspondents

R. W. P. (ST. MARY).—As the K.M.A.A. is recognised by the R. Ae.C., and as the former always recognised the scientific aspect of model aeroplaning, we should say that as soon as the Association gets going it will encourage the construction of scientific models. But where is the line of demarcation? The so-called flying stick can be a scientific machine, if constructed to prove the truth or otherwise of a premise, and in this respect it cannot be a matter of guesswork to achieve a duration of 5 mins. 5 secs., as Louch informs me he has done. My own opinion is that *any* model constructed according to scientific principles is a scientific model. Anyone can make a model resembling a full-size prototype that won't fly; this is not a scientific model.

SIDE-WINDS

A USEFUL little calendar to hand from Messrs. Pinchin, Johnson & Co., Ltd., the well-known varnish, colour and paint manufacturers, reminds us of the amalgamation of that firm with Messrs. Wilkinson, Heywood & Clark, Ltd. The combined knowledge and experience of these two old-established firms must be unique, and the scientific and physical facilities of the combination are so extensive that the service they are able to render their clients must naturally benefit. In future there will be one joint Head Office at General Buildings, Aldwych, W.C., but we understand that there will be no change in the policy of either house, except that representatives will be in a position to offer the products of both factories. The phone calls for the private exchange at the new Head Office is City 7840 and Holborn 1361; while the telegraphic addresses are "Pinchin-phone-London," and "Storson-phone-London."

Two very dainty calendars are to hand, one from Messrs. A. V. Roe, decorated with a fine photograph of St. Paul's Cathedral and the vicinity, taken from an Avro Machine, and the other from the British Piston Ring Co., Ltd., with a charming picture, beautifully printed in colours, of a girl's head. The latter firm will be pleased to send a copy to any reader who applies for it to them at Holbrook Lane, Coventry.

SOME convincing photographs bringing out the qualities of the Imber anti-fire tank are included in a booklet which has just been brought out by the Imber Anti-Fire Tanks, Ltd., of Park Street Works, Islington, N.1. One shows a tank which did not leak after 20 bursts of armour piercing and incendiary bullets had been fired through the tank, not to mention the exploding of a grenade, a foot away. Incidentally, designers who are engaged on machines intended for the Government aircraft competition, should note a request that they communicate with Imber Anti-Fire Tanks, Ltd., as early as possible, stating their requirements so that there may be no delay.

HAVING had their attention drawn to a statement by a firm of English sparking-plug manufacturers to the effect that their plugs were used by the late Capt. Sir John Alcock for the Transatlantic flight and also by Mr. Hawker, Messrs. S. Smith and Sons (M.A.), Ltd., are anxious to refute this statement and wish it to be known that "K.L.G." plugs were used by all competitors in the Transatlantic flight, including the winner; they were also used by the winner of the Aerial Derby, and in the five Sunbeam-Maori engines of H.M. Airship R 34, and finally we are glad to be able to announce that Capt. Ross-Smith, D.F.C., A.F.C., had the Rolls-Royce engines of his Vickers-Vimy machine equipped with "K.L.G." plugs for his remarkable flight to Australia.

MESSRS. NAYLOR BROTHERS (LONDON), LTD., the varnish specialists, have now moved into their new works at Slough, Bucks, and ask their friends to note the alteration in their telephone call and telegraphic address. The former is now 121 and 214 Slough, and the latter "Naylor, Slough."

A VERY clear office calendar is to hand as usual from Messrs. Jos. Freeman, Sons and Co., Ltd., of Garratt Lane, Wandsworth, S.W.18, and any readers who wish to have one should send along a request addressed as above, together with their trade card.

COMPANY MATTERS

D. Napier and Son, Ltd.

THE directors announce a dividend of 10 per cent., less tax, on the ordinary shares for the year ended September 30, 1919, to shareholders registered on December 13, 1919.

Triplex Safety Glass Co.

THE report of the Triplex Safety Glass Co. for the year ended November 30, 1919, states that owing to the general disturbance in the industrial world the accounts show a loss on trading of £10,550. This sum has been deducted from the available balance brought forward, after payment of the final dividend of £3,000 and a further sum of £5,000 paid on account of excess profits duty, leaving £14,516 to be carried forward, subject to any further sum payable in respect of excess profits duty. Under these circumstances the directors do not recommend the payment of a dividend. In consequence of the disturbance referred to, the production which was expected in the motor, aeroplane, shipbuilding and general building industries did not take place, and the company has not had the benefit of the orders placed with it, as the manufacturers have been unable to take delivery. Owing to the shortage of supplies of raw materials, the production of the company has also been seriously restricted. The directors are of opinion that when the industries of the country resume their normal state the business of the company may confidently be expected to return to its former successful position. In April last the authorised capital was increased to £200,000, and in addition to the 60,000 shares already issued, 60,000 new shares were issued at a substantial premium, which has materially strengthened the financial position. In view of the unexpected industrial conditions, it was considered advisable to defer for the present the extended building programme which had been conditionally approved, and to invest the funds produced by the recent issue in easily realisable securities.

NEW COMPANY REGISTERED

JOVEL ENGINE (PARENT CO.), LTD., Seymour House, 17, Waterloo Place, S.W.—Capital £1,000, in 950 ordinary shares of £1 each and 1,000 management shares of 1s. each. Acquiring from G. J. Butler, J. A. Vielle and E. W. Jodrey, an invention for improvements in rotary internal-combustion engines, etc. First directors: J. A. Vielle, G. J. Butler and E. W. Jodrey.

AERONAUTICAL PATENTS PUBLISHED

Abbreviations:—cyl. = cylinder; I.C. = internal combustion; m. = motors

APPLIED FOR IN 1916

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published January 8, 1920.

15,622. R. APPLEYARD. Height-finder. (136,179.)

APPLIED FOR IN 1917

The numbers i nbrackets are those under which the Specifications will be printed and abridged, etc.

Published January 8, 1920.

9,956. G. CAPRONI. Indicator of speed of revolution. (136,185.)
15,909. R. APPLEYARD. Aircraft speed-indicator. (136,181.)

APPLIED FOR IN 1918

The numbers in brackets are those under which the Specifications will be printed and abridged, etc.

Published January 8, 1920.

16,614. A. TEBALDI. Hydro-aeroplanes. (136,208.)
20,215. H. N. WYLIE. Tubes and tubular members for aeroplane struts, etc. (136,224.)
20,232. WOLSELEY MOTORS, LTD., AND A. J. MCCORMACK. Mounting and driving aircraft propellers. (136,226.)
20,327. J. S. WHITE AND CO., AND A. A. MEECH. Turnbuckles. (136,234.)
20,428 and 20,711. G. H. THOMAS AND G. S. WILKINSON. Means for starting aeroplane engines. (136,244 and 136,269.)
20,887. F. R. G. MILTON. Controlling aeroplanes. (136,278.)
21,061. METAL PARTS MANUFACTURING CO. Liquid level gauges. (132,485.)
21,260. D. J. MOONEY. Fittings for aircraft. (136,293.)
21,891. W. R. DAWE. Rotary engines. (136,313.)

NOTICE TO ADVERTISERS

All Advertisement Copy and Blocks must be delivered at the Offices of "FLIGHT," 36, Great Queen Street, Kingsway, W.C. 2, not later than 12 o'clock on Saturday in each week for the following week's issue.

FLIGHT

The Aircraft Engineer and Airships

36, GREAT QUEEN STREET, KINGSWAY, W.C. 2.

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